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# GLEANNINGS

## IN BEE CULTURE

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# GLEANNINGS

## BEE CULTURE

A JOURNAL DEVOTED TO BEES AND MONEY AND HOME INTERESTS.

ILLUSTRATED SEMI-MONTHLY

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No. 1



THE VALUE of that article on page 1155 depends upon the truth or falsity of the statement that white clover never winter-kills. What do the authorities at the agricultural experiment stations say about it? Please look it up, Bro. A. I.

C. E. WOODWARD, p. 1157, thinks the merits of the break-joint honey-board have been overlooked. Some of us who used them for years appreciated them highly; but we were glad to throw them away for something better. In any case I wish Mr. Woodward would tell us how a honey-board would prevent the bees from fastening the frames together or fastening the bottom-bar to the floor.

THE EDITOR says, p. 1159, "Your form of agreement is all right, except that you leave out all reference as to who furnished the hives—for the increase that goes to the operator." Doesn't the first sentence, p. 1159, say the proprietor shall do it? Clause 5, Management, is rather loose—gives chance for a scrap as to how much increase "is consistent with good management." [Thanks for the correction. —Ed.]

"MR. ABBOTT insisted that bees did not freeze to death if they had plenty of stores—that they starved to death." P. 1150. I understand him to say in the last issue of *Modern Farmer* that a single bee will quickly freeze, and I suppose he would admit that two bees on a solid comb of honey would freeze. What I'd like him to tell is what number of bees must be reached before they will stop freezing and begin to starve.

I MOVE an amendment to Bro. Doolittle's rule, p. 1147, where he says he prepares "sections to the amount of 125 pounds for each colony I have in the fall." That would leave

him short if he should have 166 $\frac{2}{3}$  pounds per colony, as he reports for one year. My amendment is to have for each colony enough for the maximum crop, with about 10 sections thrown in for empty and unfinished sections—not less than 175 in his case.

G. M. DOOLITTLE, p. 1147, tells about lying awake one to three hours studying up what to do with the bees. Tut, tut, Bro. Doolittle, don't you know it's bad for the health to do that sort of thing? When you go to bed, go right to sleep; do your studying in daytime. And yet—and yet—the man who has never lain awake studying about his bees is hardly a genuine bee keeper. I've learned a whole lot about counting when trying to let go of some tough bee problem after the "one to three hours" were up.

"THE RABBIT, as now made in the Dove-tailed hive," says Dr. Kerr, p. 1164, "is its weakest point." I strengthen it very satisfactorily by nailing on each end a 1 $\frac{1}{2}$ -inch cleat as long as the outside width of the hive, the cleat coming flush with the top of the hive. Such a cleat is worth while for that purpose alone, and is worth while for the sake of handling the hive, even if the rabbit didn't need reinforcing. [Each bee-keeper can do that for himself, but the supply-dealer can not very well. —Ed.]

NEVER RUN ACROSS extra-yellow bees that were not cross, Mr. Editor? p. 1162. I had them from G. M. Doolittle that were probably as golden as any on the face of the earth, and I do not remember any trouble with their tempers. [We have on file a list of several customers who bought some of the Root Company's bees that had a dash of yellow blood. All were pronounced cross. One man is even now so mad that he swears he will never again deal with the Root Co. He called the bees "vixens," the meanest and crossdest bees he ever saw or heard of. You see, the drones of some of these yellow bees got to flying, and the result was we had some quite bad complaints of queens that had mated with them. The yellow drones referred to were not from Doolittle's queens. This stock came from one of our Southern breeders. While I do not deny



that there may be gentle bees among yellow stock, their disposition, so far as I have been able to observe, is much crosser than the *average* yellow-colored Italians.—ED.]

YOU ARISE, MR. EDITOR, p. 1143, to ask how I know that bees carrying pollen were only five days old. I'll tell you. I got an imported queen and wanted to make a sure thing of introducing. I fastened the queen in a hive with not a living bee, but with brood just ready to emerge. Five days later the entrance was opened, and in a short time the liberated bees returned with loads of pollen. Isn't that proof? [Could not be better. You remind me of the witness who, when asked by the prosecution how far he was away from the man who was shot, replied instantly, "Nine feet, four and a half inches." "How do you know it was exactly that?" "Because," said the witness, "I thought some fool of a lawyer would ask me, and so I measured it immediately." Yes, your proof is indisputable. I felt sure you knew whereof you were talking; but sometimes we like to know the real foundation of a direct and positive statement.—ED.]

YOUR RECOLLECTION as to the consensus of opinion as to mid-winter flights, I *think*, is wrong, Mr. Editor, p. 1145. I think that the general opinion was that taking bees out for a flight and then returning them to cellar was a damage—certainly that was my opinion, an opinion that remained undisturbed until you made trouble by raising the question as to its correctness. As I said, p. 1145, I've been taking some out for a winter or two, but I couldn't be positive whether they were better or worse for it. I think you overestimate the unbrokenness of the cold in this location, for usually there comes a day before time for taking out that is warm enough for a flight. When that day comes this winter, I expect to take out some bees. [I sincerely hope you will have a suitable flight-day so you can test a part of your bees. I do not like to be alone in this controversy of mid-winter flights. I do not guess, but I *know* it is a good thing here at Medina, and I should like to know how far the principle would apply to other localities.—ED.]

MR. EDITOR, I don't understand what you say, page 1149. If you have some private information about the views of the Board of Directors, out with it. I have no recollection that they have passed any resolution which commits them to the view that defending members in their rights stands as the most important work to be done; neither do I remember that any member has privately expressed such a view. On the contrary, within a few weeks I have offered a motion whose passage I somewhat confidently expect, providing that in no case shall the National bear more than half of the expense of any lawsuit. The National has done a grand work in establishing precedents in such cases, and it is to be hoped that the time is not far distant when it may not be necessary for it to spend money to pay even half the cost of

a lawsuit. If you have any stronger appreciation than I of the importance of fighting adulteration, it must have a strong rating with you; and I don't know that my views differ from those of other members. I may not agree with you as to how the fighting should be done; but as to the vigor of the campaign I'm with you. I hope the battle may be waged so fiercely that adulteration in its turn may become a secondary matter, and another thing that I have now in mind may come to the front; "but that's another story." [I had no private information from the Board of Directors nor from any member of it. If you will turn to the first page of the annual report of the General Manager for 1904, and read the published letter from the Chairman of the Board of Directors, you will see where I obtained my information. I was not criticising Mr. Marks or the Board, but I only regretted that the policy there stated should be as follows: "The suppression of adulteration . . . is a secondary object with the Association . . . The Association must not be expected to neglect or jeopardize the prime object of the Association, 'to protect and defend its members in their lawful rights.'" I do not understand by this that the policy is to ignore the question of adulteration, but only to put it partially in the background in order that the defense feature may be given the fullest prominence. Considering the number of petty quarrels between bee-keepers and their neighbors—quarrels which have come up of late and which could have been avoided—it begins to seem as if the insurance feature is being overdone. Indeed, I know that the General Manager is being overworked in settling up and adjusting matters at issue between the bee-keeper and his neighbors. So arduous have his duties become that it is a question whether he or any man can stand it much longer without breaking down in health. To settle a neighborhood dispute helps *one member only*. To strike a blow at adulteration helps *every member of the Association*. The greatest good to the greatest number should now be our motto. Understand, I am not quarreling with the Board of Directors; and if I had been on the Board at the time the action was taken I undoubtedly would have voted with the majority. But conditions have changed. I now believe that the adulteration question should be the most prominent, and is the one that should receive the best brains and thought of the General Manager, and of the Board of Directors back of him. I do not mean to convey the impression that the Association should drain its treasury in this or any *one* line of work; but I do believe that we should either lessen the duties of the General Manager or pay him a larger salary. If we cut off the labor involved in neighborhood quarrels he can give more attention to other matters pertaining to the Association. Now, let it be understood that General Manager France has not complained to me or any one else; but I do know that he is an overworked ser-



vant of the Association. I hope your motion will prevail. I believe it will.—Ed.]



Bee-keepers should not have to shake bees off the combs when the weather is too cool for them to fly freely. If you are ever obliged to do such a thing, shake them into an empty story placed on top of the brood-chamber. They are thus more likely to get into the cluster without becoming chilled.

An item in the Kingsburg (Cal.) *Recorder* says that at a recent meeting of the stockholders of the Central California Honey-producers' Association, it was decided to disincorporate the organization. It is said that last year's business was not very successful. It is a pity that an enterprise so promising, one of the pioneers in a field where organization and co-operation are so badly needed, should thus collapse so early in its career.

Miss Wilson's article on cleaning propolis from separators, etc., by the use of lye is valuable; but if she will tell us whether the kettle into which she puts three cans of lye holds ten, twenty, or a hundred gallons, it will be a little clearer to the inexperienced. I once boiled a lot of hives and frames, using a box of lye to about forty gallons of water, which is probably much less lye than Miss Wilson used. It took off the propolis fairly well, though more lye would doubtless have removed it more quickly and thoroughly.

Some of my correspondents have sent me copies of their local papers in which they have had inserted in the form of a news item the offer of the National Bee-keepers' Association to forfeit \$1000 for samples of manufactured comb honey. More of this might be done, with very good effect. Most papers would be entirely willing to publish this if it were properly brought to their notice. It gives a local interest to the matter, and adds impressiveness to say that "The National Bee-keepers' Association authorizes G. W. Knowles, its local representative (or any other member), to forfeit \$1000 to any one who will produce two sections of manufactured comb honey." Some have asked me why two sections should be required. Although I have seen no reasons given for this, I presume it is because this gives a good opportunity to point out the fact that no two sections of honey are exactly alike.

[This is a most excellent idea; and if all our subscribers would prepare an article for their local papers, denying the existence of manufactured comb honey, it would go a long way toward correcting the general belief that comb honey is manufactured.—Ed.]

An English bee-keeper, writing in the *American Bee-keeper*, extols the gentleness of his Punic bees, but declines to believe that any one would be so rash as to attempt to handle bees without a veil, since "It is beyond belief that any race of bees armed with stings will permit themselves to be robbed without attempting to retaliate, for one's breath is sure to invite attack, even from half-stupefied bees." Sounds queer, doesn't it? I wonder what proportion of what might be called professional apiarists habitually use a veil. A number I know do not. As for myself, even when handling all sorts of bees under all sorts of conditions, as bee inspector, it is but very seldom that I would be bothered with a veil.

I do not believe that dry weather affects the color of honey, except that in non-irrigated countries it is apt to lessen the yield, so that bees, in their search for honey, work on plants that ordinarily they would leave alone. The honey thus secured is apt to be darker and poorer in quality than what they get from ordinary sources. In the irrigated districts of Colorado and Utah, where alfalfa is grown, the air is extremely dry, though the ground may be well watered. When alfalfa honey is secured free from any admixture, it is water-white in color, and I have never seen any thing to indicate that the weather had any thing to do with the color. In this valley, though, it is but seldom that alfalfa honey is secured alone. An average of my honey, even excluding the fall honey, which is distinctly darker in color, is of a light golden tinge.

I have been unable to learn any thing further about the way in which comb honey is used in confectionery, owing to the absence from home of the friend who sold the honey for this purpose; but I imagine that, like most soft candies, it is made with but a moderate amount of cooking and a great deal of stirring, especially just after it is removed from the fire. In this manner the wax is thoroughly mixed through the candy, and helps a very soft candy to keep its shape instead of melting down and becoming sticky with the changes of temperature and moisture. Paraffine is sometimes used for this purpose; but the comb honey, containing wax in about the right proportion, already finely divided and well mixed through the mass, is probably less trouble, besides being superior in other respects.

I have no quarrel with those who, like H. H. Hyde, prefer the Hoffman frame and are willing to take as much pains to keep it in

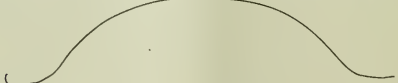
running order as he says he does. I have said repeatedly, and I will say it again, that the Hoffman frame is all right for such bee-keepers. But the average bee-keeper will not trouble himself to go over his hives every spring and scrape off all surplus propolis. In fact, it is almost impossible to get him to do any thing whatever to keep his hives in good working order. I should not enjoy that sort of thing myself. Many of my hives have had bees in them for eighteen years or more, and I have not yet found any necessity for scraping the propolis off the end-bars. The frames separate about as easily as they did on the start. I really should not care to undertake the job of scraping the propolis off the end-bars of the nearly 5000 frames I have in use every spring. But if you like to do it, and have time for it, it is all right. My only contention in regard to the Hoffman frame is that, in the hands of the average bee-keeper, it comes pretty near not being a movable frame.

Doubtless some have felt that Prof. Eaton's comment on the article of W. K. Morrison on "The Comb-honey Lie" was too severe. It was caustic criticism, it is true, but I can not but feel that it was deserved. While the article in question contains much that is good, a part of it is misleading. It makes statements that many persons in the ordinary walks of life, to say nothing of those who have had special training on these subjects, know to be exaggerated and untrue. We should understand, in the first place, that Prof. Eaton's criticism applies only to the paragraph relating to glucose. This paragraph was quoted in the *American Bee Journal*, and it was against this quoted paragraph that Prof. Eaton's attack was directed. I have felt for a long time like entering a protest against some of the things that have been said in the bee journals about glucose. Some glaring misstatements have been made. At other times, while what has been said was not exactly untrue, the facts have been distorted and given a deceptive coloring. Doubtless this was not intentionally so. When a man wants very much to believe a thing he does not question very closely the evidence in its favor, and he is quite apt to overlook the evidence against it. So we have such statements as "Bees can not be made to take glucose;" "glucose is poisonous to bees;" "they will starve sooner than touch it," etc. We can not afford to make these misrepresentations. We have suffered a great deal from the "scientific pleasantries" and downright romancing in regard to our industry in the newspapers and magazines, but we have no right to complain of it as long as we employ the same tactics. Such arguments, wholly untrue, or containing only half the truth, may seem to serve a temporary purpose; but sooner or later they will work against us. There is plenty of argument against the adulteration of honey by glucose or any other substance without resorting to misrepresentation. We weaken our position and

furnish weapons to our enemies when, in our arguments, we depart from the plain truth. When we can not confine ourselves to that, it would be better to say nothing.

With regard to the use of springs for keeping brood-frames pressed together, the idea is original with me. I have experimented somewhat with them for that purpose, but am not yet prepared to say whether I like them as well as screws. I can not agree with those who think neither is necessary. I have had abundant opportunity for testing this. Most of my hives have been in use a long time, about eighteen years or more. It is but natural that in some the screw feature has become worn out, usually through the failure of the screw-thread cut in the soft pine of the hive side. With these, until I have got around to repairing them, I have had to depend on crowding them closely together with the knife I use in separating the parts of hives. To me, at least, this is not nearly as satisfactory as keeping them crowded up with the screws.

Inexperienced bee-keepers can not be depended on to do any thing properly. My experience in inspecting bees has shown me that not one in ten will keep Hoffman frames crowded together. In employing help to handle my hives, I have found it very difficult to get them to tighten up the screws after they have been loosened for any purpose. It is for this reason I think that springs might be better for the average bee-keeper than to use screws or to attempt to get along without any thing of the kind. If they could be induced to put them in place once, they would stay there in full effectiveness until they were removed, which might not be for years. When they are removed, something would have to be done with them. While some of them would doubtless be lost and others purposely dispensed with, I think most of them would find their way back into the hives, and it would be hard to put them into the hives so that they would not do some good. For brood-frames I think it would be advisable to use a heavier spring than is necessary for supers. They should be made of well-tempered material, and should have a sharp backward bend on one end so that they can be readily removed with the ordinary hive-tool. The diagram below shows the only really satisfactory super-



spring I have ever used,  $\frac{3}{8}$  wide. I will send you a sample if you wish. These came from the G. B. Lewis Co. [This super spring is exactly the shape devised by the Root Co., and adopted by the G. B. Lewis Co., although it is after the *general* pattern of the one used by Capt. J. E. Hetherington something like thirty years ago. For use in the brood-nest a much stiffer spring undoubtedly would be required, and I am not so sure



but such a device for producing compression would give excellent results in connection with the Hoffman frame.—ED.]



#### SPRING MANAGEMENT.

A knock at the door! Mrs. D. ushers in a stranger. He sits down by the fire, holding out his hands to the same, and says, "Cold day, this!"

"Yes, stranger, this is a cold day. Ten below zero when last I looked."

"This, I suppose, is Mr. Doolittle, the bee-man."

"That is what I am called by some."

"My name is Weeks, and I should like to talk with you a little time, if agreeable, about what to do with bees in the spring when we commence active operations with them, say from the time they are set out of the cellar till the first flow of nectar which gives a surplus."

"Well, I am agreeable. What is your first flow of nectar, Mr. Weeks?"

"That flow is usually from white clover in our section."

"By your saying 'set out of the cellar' I am led to think that you winter your bees in the cellar."

"Yes. I have not been in the business long, but I think cellar wintering is the best way to winter bees here in the North."

"Undoubtedly that is correct. And the first work that will confront you in the spring will be setting the bees from the cellar, so we will talk about that first. I follow a different plan in setting the bees out from what most apiarists do; and after trying all the different plans for years which have been given I like the one I now use better than any other."

"I did not know that there were different plans for setting out, and I shall be only too glad to hear of yours."

"I always leave a few colonies outdoors during winter, to 'liven up the gloom' a little should a warm day occur; and, beginning with the first day in which these outdoor bees gather any pollen, I commence at about 2:30 P.M. to set out a part of those in the cellar, say from ten to fifteen colonies, as the case may be, scattering them about the bee-yard so that they will be as far apart as possible, and yet be within the limit of what space I wish the yard to occupy."

"Why do you do that? I set mine out all at once, and supposed every one did, setting each on the stand it occupied the summer before."

"Yes, that is the way I formerly did; but in setting out as I now do, there is no need

of keeping track of where they formerly stood, and yet not having any mixing of bees, as is the case where all are set out at once and near together. Were all set out at once, as most apiarists do this work, there will be more or less of colonies mixing up, unless each colony is set on the same stand it occupied the fall previous. To set them thus requires a great deal of extra work, numbering hives, stands, etc., which is quite an inconvenience, and even then does not prevent some colonies getting far more than their share of bees."

"I know that the numbering of stands, etc., requires work, but had supposed there was no other way. But go on."

"To set out, I place my spring wheelbarrow and lighted smoker near the door of the bee-cellar, when I carefully open the door, quickly step in, and take the hive nearest the door, placing it on the wheelbarrow, when the door is immediately shut again. The bees in the hive now begin to realize that their long winter nap is at an end; and unless some precaution is used they will fly out of the hive to quite an extent."

"Yes, and sting like adders—at least mine do. Tell me how you remedy this."

"To avoid this state of affairs I now blow several puffs of smoke in at the entrance or under the hive, when a wet cloth is so placed that it will keep the bees in till they are set where they are to stay, when the cloth is taken off and the bees allowed to fly."

"Don't they rush out pell-mell at first?"

"No. They come out as leisurely as they would had they not been disturbed; while, had not the smoke been given, they would have all piled out of the hive with a rush, or pell-mell as you put it."

"I am glad to learn about this, as mine have always bothered about coming out and stinging, scattering all about on the road to the apiary, and getting lost."

"Yes, I know of these troubles from former experience. And this going out slowly not only overcomes that part, but it is a great advantage to them in marking their location and repelling robbers. The next pleasant day more are set out in the same way, and at about the same time, scattering them about as before, but paying no attention as to how near they come to those already out, for they are liable to mix only with those set out at the same time."

"There is another new thought to me, and I am led to believe that is right. One time it clouded up while I was setting the bees out, so I had to stop for that day; and I noticed when I set the rest out that they did not mix at all with those set out before. But after setting out, what next?"

"The next work after setting out is to know that all have plenty of stores."

"Yes; but how can this be found out should it be too cold for the bees to fly, as is often the case?"

"To find out in this matter I generally look after the honey the first cool morning, when I carefully raise the quilt or cover and look for sealed honey along the top-bars of



the frames. If plenty is seen they are all right till they are to be carefully looked after three weeks later. If little or none is seen, they must be fed; for if we are to reap good results from our bees they must have plenty of stores at this time of the year to encourage brood-rearing."

"That is a new way to tell about the stores to me, and it appears simple and easy. But suppose you have to feed—what then?"

"For feed at this time, I prefer combs of sealed honey set in next to the cluster. If none such can be had we must feed sugar syrup, or liquid honey if we have it; but the latter tends to promote excessive robbing."

"I have the combs of honey, so I will be all right here. What about the three weeks later looking after, which you spoke about?"

"Three weeks after setting out, the hives are to be opened generally, for the first time, as no good can come in making a general opening when the weather is cold. At this opening we look after the queen, clip her wing, ascertain the amount of stores on hand, and reverse the brood-nest by placing the two center frames of brood on the outside, and the outside ones in the center."

"Do you think this pays?"

"I certainly do or I would not do it. A great gain is made by so doing, as all the older brood is in the central combs, which are generally filled to the outside of the frames, while only small patches of eggs and larvæ are in the outer ones. This reversion causes the now inside frames to be filled entirely with brood in the shortest space of time, while there is little danger of chilling the brood in this way."

"Well, I shall be tempted to try this on a few this next season, and see how near right you are."

"That is right. Go slow on any thing new to you, and in thus going you always go sure. At this time I also see to it that each colony has plenty of stores to last two or three weeks; for at no time should the bees feel that they must economize in stores, if brood-rearing is to go on rapidly, which it now must if we are to secure a good harvest of white honey from the clover bloom."

"I am well aware that a large amount of brood at the right time before the honey harvest insures a good surplus, and the securing of this brood at the right time has been one of the puzzling parts of apiculture to me. I think this talk will help me much. Tell me what further you do."

"In about ten days take one of your frames of honey which you say you have on hand, and, after breaking the sealing of the cells, insert it in the center of the brood-nest. In the removing of the honey from this comb the bees are greatly stimulated, and brood-rearing accelerated. In a few days more the brood-nest is again reversed; when, if all has worked well, there will be brood in all but the two outside combs, right along, and in these also in a few days more, owing to the full sheets of brood coming next to them."

"I had supposed from what I read that the spreading of brood was an awful job; but

as you tell it there seems no more work to it than the feeding, equalizing, etc., given by others."

"When you get used to this way of working you will fall in love with it, if you are any thing like me. When the hive is full of brood the surplus arrangement is to be put on, and this generally brings us to the time of the honey-flow from white clover, and covers the ground you wanted covered."

"Thank you. I shall try something of what you have told me."



THE Root Co.'s new moving-picture outfit showing bee-keeping operations in actual progress on the screen, together with a new set of stereopticon slides, will be exhibited at the various bee institutes and conventions in York State. See Convention Notices.

#### APICULTURE RECOGNIZED BY UNCLE SAM.

THE reader's attention is directed especially to "Sidelines from the St. Louis Convention," p. 16. The experimental work that is already begun by the United States and by Texas, as well as some other States, is certainly a cause for rejoicing. The fact that Mr. Benton has been in the Department of Agriculture some thirteen years has led some to wonder that we have not heard more from him than we have. When it is understood that a good part of the time his labors were confined to general entomological work, we can understand why he could not devote more attention to our favorite pursuit, apiculture. But now that Uncle Sam has given it a *distinct* recognition by an appropriation of \$5000, established an experimental apiary, and has four salaried employees who will devote their time exclusively to investigations and experimental work on bees, a new era has opened, and I think we may expect some important results.

#### SIDELIGHTS FROM THE ST. LOUIS CONVENTION; TEXAS AS A BEE COUNTRY.

FOLLOWING the address of General Manager France we listened to one by Mr. Louis Scholl, of College Station, Texas, who now occupies the position of Assistant Entomologist and Apiculturist at the station, and, naturally enough, he had been in position to gather facts and data of value to this convention in St. Louis. He said they had a State down there, a great big piece of land, and some of the apiaries were of pretty good size, not only in the number of colonies, but they grow big too.

From estimates arrived at from sources

secured in the State, Texas had something like 400,000 colonies of bees within her borders, and produced something like 5,000,000 lbs. of honey, or an average of only about 12 lbs. per colony, as there are so many small beekeepers in the State. But even at that low average he thought that Texas was in the lead in the annual output of honey. But in this I believe he was mistaken. This 5,000,000 lbs. of honey in cars would make an aggregate of from 100 to 150 carloads. California will equal that in any of its years, and in a good year it will produce all of 500 carloads. But Texas, while it may not yet be in the lead, is quite likely to step clear to the forefront. Large in size, it has vast areas of honey-producing plants—plants that will never be used for anything but forage for cattle and forage for bees. He would divide the State as follows: In Northern Texas—north of Fort Worth—there would be but very few bees, for cattle-raising was the principal business. In the eastern part there were very large pine forests and rice lands, and a good deal of basswood. But the trouble was, that that part of the State was not yet settled, and there were but very few bees to gather the honey. Central Texas was the great cotton belt where large quantities of cotton honey were produced, and some horsemint. Western Texas was a somewhat mountainous portion, and only some localities there produced honey like sumac. Southern Texas, below Houston, was a low swampy plain where grows the raton that yields a large lot of honey but of poor quality.

#### THE BEE PARADISE OF TEXAS.

But Southwest Texas was a land of milk and honey—a locality that could not be surpassed anywhere in the world—where there was an almost unlimited amount of bee pasture such as mesquite, guajilla, catclaw, and many other plants too numerous to mention. In this part of the country there were many good available bee locations, but they were too remote from railroads and civilization. One would have to push out in the woods and draw his crop to the railroads some fifty miles.

It is this country I visited myself some three or four years ago, and which I thought was the bee paradise of all America.

Regarding his experimental work at the college, Mr. Scholl stated that at College Station, Texas, there was an apiary of forty colonies with a bee-house, and a full equipment kept there for show and for the use of students, and to carry on experimental work. He thought it was the best experiment apiary in the United States. It was established in 1902, with an appropriation of \$750 to start with. Later on the appropriation was increased, so that the station has been able to improve its facilities and usefulness. Many different kinds of plants for honey had been tested—as many as forty; but there were found only a few adapted to the conditions in Texas.

Mr. Scholl also said they had tested several races of bees; and when the results

were fully collected they would be published. He outlined a number of experiments that he had in mind, and hoped to give the bee-keepers the result of them later on.

Following the address of Mr. Scholl was an exhaustive paper by Frank Benton, Apicultural Investigator of the Department of Agriculture, Washington, D. C., on the subject of—

#### WORK IN APICULTURE AT THE UNITED STATES DEPARTMENT OF AGRICULTURE.

He paid a glowing tribute to the late Dr. C. V. Riley, his old chief, who, although not a bee-keeper himself, was very much interested in the general subject of bees; and if some of his plans could have been carried into effect, apiculture at the Department might have been put forward several years. He quoted from the doctor's address made at the North American Bee-keepers' convention at Washington in 1892, in which Dr. Riley had said that some of the most beneficent and far-reaching work of the Department was done during its early history, when its means were limited, and when the field was fresh. Beginning about the first edition of Langstroth's celebrated work, or nearly a decade before a bee periodical had been printed in the English language, the Department reports from year to year gave some notice of progress in bee culture by publishing statistics of honey, and on several occasions excellent little treatises on bees and bee management. Probably but very few knew that the Department of Agriculture had any thing to do with the introduction of Italian bees into the United States. The fact was, the first successful importation of Italian bees from their native land to America was made by the Department, and it was almost wholly from this importation that such successful apiarists as Langstroth, Carey, and Quinby bred and disseminated the race during the early 60's. Dr. Riley, while not a successful bee-keeper, nor, in fact, could ever be classed as a bee-keeper, was very much interested in having apiculture recognized by Congress. It is not surprising that he was disposed to view favorably the establishing of an apicultural station in 1885 in connection with his entomological work in the Department. In this he was ably supported by Mr. N. W. McLain, an old-time friend and an enthusiastic beekeeper. This was at a time when there was no special appropriation for apiculture, nor, indeed, any thing during the whole of Dr. Riley's administration; but in spite of this he had been instrumental in getting the station started, the funds being drawn from the general appropriation for the Division of Entomology, for he believed that he was fulfilling both the spirit and the letter of the law which authorized the expenditure of certain sums for the promotion of economic entomology.

At this point Mr. Benton, lest those familiar with what had been printed on the subject should call him to account for the foregoing, digressed to correct a mistake made by W. K. Morrison in GLEANINGS for



July 15, 1898, page 554, to the effect that he (Morrison) had been instrumental in procuring an appropriation of \$5000 for the benefit of bee culture, and that Mr. Morrison himself was to be the first appointee. Nothing could be further from the facts. There was no appropriation of \$5000 nor any other sum for bee culture at the time indicated—1885 to 1887; nor was there ever a special appropriation for apiculture previous to 1901, as he proceeded to show by tables taken from the records in the Department.

Notwithstanding the work of N. W. McLain had been criticised by bee-keepers and by the bee-papers at the time, Dr. Riley felt that a good deal of that work was valuable, especially the part relating to the experiments to test whether bees could be made to puncture sound fruit. The results showed that they could not do so, and have been since quoted very widely as authoritative. Following the work of Mr. McLain there was a lull in apicultural work; but in 1891 a series of experiments was conducted at the Michigan State Experiment Station, under the direction of Prof. A. J. Cook, assisted by John H. Larrabee. This was discontinued shortly after. In the mean time it had been Dr. Riley's desire to secure the giant bees of India; and he had already addressed a letter to the speaker, offering him a commission to proceed to India and secure those bees; but before the letter reached him he was back to his native land after an absence of eleven years. Owing to some technicalities, however, Dr. Riley was unable to secure the authorization to send to Mr. Benton, and he appears instead to have been employed in the general work of the Division of Entomology.

The untimely death of Dr. Riley somewhat changed the aspect of affairs, and it was only gradually that the importance of practical apicultural work could be sufficiently impressed on the authorities to result in a more liberal policy toward this industry. Meanwhile thousands of letters relating to apiculture had been answered by the speaker, and many thousands of bulletins had been sent out to all parts of the country. Teachers in the Normal College in the District of Columbia, and of the public schools of Washington, as well as teachers in nature study in other cities, have been furnished with information concerning bees for use in class work.

During the thirteen years Mr. Benton had been connected with the United States Department of Agriculture, he had never, he said, permitted to pass unutilized an opportunity to create in the minds of those in authority a favorable impression concerning the dignity of apiculture. All along he had noticed a growing interest in the Department; at last he had the satisfaction of seeing the matter duly appreciated, and proper steps taken to insure investigations which were so much needed. Prior to this time the title borne by himself was "Investigator in the Division of Entomology," and, later, "Assistant Entomologist." Finally,

in 1901, there was set apart a special appropriation for apiculture of \$2000, the first and only special appropriation which had been made for that branch. His own title was changed to that of "Apicultural Investigator," and his own salary, together with that of a temporary assistant for a few weeks on salary, was charged to this fund. This amount left only a small sum for investigation. He did the best he could, however, placing at the disposal of the Department his own bees, for experimental work. But in July, 1904, after a long effort and repeated representation to the authorities at the Department, and the legislators themselves, the "Division of Entomology" was raised to the rank of a "bureau," with what was practically a Division of Apiculture, with a definite sum of \$5000 for apiculture. Mr. Benton was now allowed two assistants, each bearing the title of "Special Agent in Apiculture," and the other whose title was that of "Apicultural Clerk." He had been able to secure Mr. John M. Rankin, of Michigan, a trained student in experimental work in apiculture, for first assistant, and with whom the bee-keepers of the country were already well acquainted. The second assistant was Mr. Leslie Martin, of Tennessee, an enthusiastic student of apiculture, but one who had had several years of experience in practical work with bees. A civil-service examination had been held, and since the reading of Mr. Benton's paper I note with much pleasure that Miss Jessie E. Marks, the daughter of W. F. Marks, of Clifton Springs, N. Y., has secured the appointment.

Mr. Benton went on to say that an apiary of fifty colonies had been located at Arlington Experimental Farm, on the Virginia side of the Potomac, directly across from the Department grounds. The location was ideal for testing new races of bees and their crosses with other races. Numbers of queens of valuable races were already being imported and tested. These included the gentle Caucasian bees from the shores of the Black and Caspian Seas in Russia; Cyprians from Cyprus; Dalmatians from Dalmatia, Austria; Italians from the foothills of the Alps; and, lastly, Carniolans from Austria. Nor were the giant bees of India and of the Philippines to be overlooked.

In closing he desired to express his high regard for the present Chief of the Bureau of Entomology, Dr. L. O. Howard. No man was more widely known among the galaxy of distinguished scientists whose homes were in the capital city, and no one was more highly esteemed. Like Dr. Riley, not a bee-keeper, he had come in the course of the years in which he had been associated with Mr. Benton to know something of the status of this industry.

This paper was listened to with much interest, for it gave a detailed report of the work of the Department, especially a report of the work that was being done and had been accomplished by the Apicultural Investigator, Mr. Frank Benton.





**DE LUXE COMB HONEY; A NOVEL METHOD OF PUTTING UP COMB HONEY.**

How the Russian Bee-keepers have been Getting Fancy Prices for all their Comb Honey.

BY A. E. TITOFF.

[Shortly after the St. Louis convention Mr. A. E. Titoff, who, it will be remembered, is studying bee culture at Medina, showed me some very pretty tin boxes magnificently decorated in colors lithographed right on the

lieve deserves most serious attention if not adoption in the United States.

Some years ago there appeared in the Russian market comb honey packed in tin boxes, weighing from one to five pounds. Such boxes are now made specially for the sale of honey; they are lithographed in several colors, showing views of apiaries, landscapes, and bearing also inscriptions, such as the brand of honey or addresses of bee-keepers. They are called "Exquisite" because they represent the finest of the market, bringing fancy prices when filled with honey. The boxes are one comb deep and are liquid-tight, so that all drip that may ooze from the combs cut to a size to fit will be taken care of. This manner of packing honey has spread more and more, until to-day it may be found throughout the breadth of the empire.

In order to demonstrate the appearance



FIG. 1.—COMB HONEY PUT UP IN DE LUXE TIN BOXES, AS IT IS SOLD IN RUSSIA; BOXES OPEN.

metal. These, he explained, he intended to exhibit at the big convention just mentioned, but unfortunately they came just too late. He added that nearly all of the Fancy comb honey sold in his country, Russia, was packed in these tin boxes denominated "Exquisite," which might appropriately be termed in the language of the book-maker, "*De Luxe*." There is no tin package in the United States for comb honey or any thing else that approaches it in its magnificent display of colors. The fact that comb honey put up in them brings almost fabulous prices in Russia ought to command at least some slight attention from the American bee-keeper. I became interested, had some engravings made, and in the meantime asked him to prepare an article, which he has done.—Ed.]

In the present article I intend to acquaint the bee-keepers of the United States with the method used in Russia of putting up honey for sale, that I have never seen practiced in this country, but which I be-

of these boxes there are here shown some half-tones made from photographs of samples sent from Russia. Fig. 1 represents open boxes filled with honey, the lid of the round box bearing the inscription: "Basswood Honey." Fig. 2 shows the boxes closed, the round box being inscribed: "Aromatic Basswood Honey." On Fig. 3 is seen the upper surface of the lid belonging to the square box. It represents a pretty meadow with bees flitting from flower to flower. Here the inscription reads, "Pure Aromatic Bee Comb Honey."

Our Russian bee-keepers do not produce much honey in sections, considering it less profitable, and preferring to let the bees build up combs in the ordinary extracting-

frames. When the honey is well sealed it is cut out and packed in boxes.

I anticipate that the words "cut out" and "packed" might impress some persons as describing laborious, troublesome, and tedious processes. In reality, however, they are extremely simple. Special tools are made for this purpose, cutters made to suit the size of the box. One downward stroke causes them to cut the comb on four sides simultaneously to the exact right size, and a special appliance permits it to place it in the box neatly. It is somewhat similar to the process of making cakes by means of a "cookie-cutter," which is universally adopted by the ladies, and as fast in operation. This method even permits of honey being taken from log hives; and if the comb is nice, and honey of good quality, it can be packed in the boxes and sold the same as that from movable-frame hives.

In considering the practical side of the subject, the following questions might arise: What would be the cost of this packing, and is it profitable? With regard to the ex-

labor of bees in the building-up of the combs. My observations in this respect have always shown that if nine half-depth frames are inserted into the supers of a ten-frame beehive, they are built up and filled much faster than if there had been 32 sections. In the first instance about 45 lbs. of fancy honey are obtained; in the second case not more than 32 lbs. of the same quality, while a part of the sections become No. 2, and thus further decreasing the yield and profit. Every one knows well that the bees in supers begin first to work on the middle frames over the center of the brood-nest, and that often when the middle frames are fully built up the outside ones are but half built out. Thus there is a possibility of taking the honey from the middle frames rather early, before there is a quantity of new honey offered in the market. Then it may be sold at a higher price. Here I beg to call your attention to another fact: As I said before, the bees begin to work and to fill the frames from the center of the nest. The capping over proceeds in the same fash-

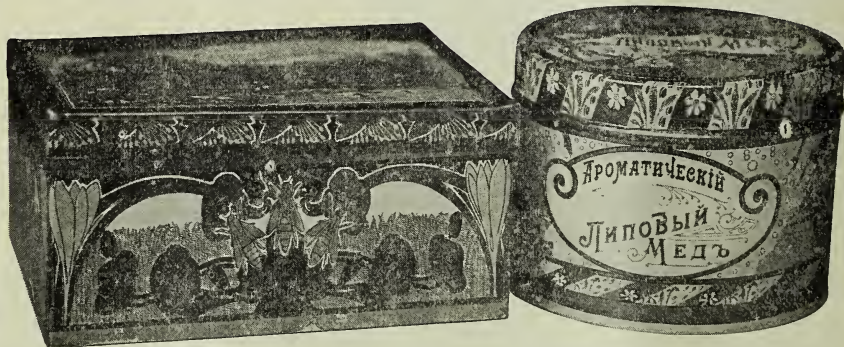


FIG. 2.—COMB HONEY PUT UP IN DE LUXE TIN BOXES. BOXES CLOSED.

pense I may say that the cost of these fancy-colored boxes in Russia, bought direct from the manufacturers, would be in American money about four cents per pound.

Granting that the packing of honey in such boxes would come as high as four cents on the average, and that in comparison with the cost of the sections this process is much more expensive, still this is far from saying that it would not be profitable to adopt this style of packing. Is it not found profitable to put up honey in glass jars, which means an expense of 3 or 4 cents per pound, or about 20 or 25 per cent of the cost of the product? Then again, discussing the question from the standpoint of profit the subject should be looked into more thoroughly. Here one must take into account the very process of producing comb honey. I do not think any reader will assert that the bees work as fast in sections as they do in large frames. The principal reason of this is to be found in the hundreds of partitions with which Americans relentlessly fill their supers, which considerably enhance the

ion. Those sides of the frames which are located toward the center are sealed somewhat earlier than those disposed laterally in the supers. Occasionally the yield suddenly ceases; the consequence being that one side of the comb sometimes remains not entirely sealed. In packing such comb honey in tin boxes this does not present any difficulty to the bee-keeper, there being no necessity to wait until the comb is perfectly capped. These one-sided combs can be packed in the box in such manner that the fully sealed side of the same will face upward while the sides with the incompletely sealed cells are turned down. In suggesting this I have not the least intention of practicing any deception on the buying public, but to show that this method of putting up comb honey permits of all combs, providing the flavor is good, being sold as first quality, and at the best price.

Being interested in the condition of the honey business in this country I was permitted to work for some time in the honey department of The A. I. Root Co. Thanks



to the kindness of Mr. J. A. Warren, manager of this department, I had opportunity to acquaint myself intimately with the grading of comb honey, having graded tens of thousands of sections with my own hands. During this time I came face to face with facts such as confront every producer of comb honey. Let us take two sections of honey of the same quality. One is perfectly sealed on both sides, and is laid aside as Fancy honey while the other is perfectly sealed on one side and is perfect, though a few cells on the other side are not perfectly capped or are slightly injured, perhaps scratched. Now this section containing just as good honey as the other must be sold as No. 2,

sume an unpropitious summer, bad weather, and poor yield. Your bees may have half filled the sections and ended their labors. What can be done with the sections in such a season? This question is frequently asked in the columns of apicultural papers. How can they be preserved without spoiling the quality of honey? And what amount of trouble and what bitter disappointment you encounter when it has to be put through the extractor! In such cases large frames would be much better to manage.

Thus recognizing the superiority of the production of honey in large frames over the production of it in sections, we have a thorough warranty to justify fully the as-



FIG. 3.—COVER DESIGN, FULL SIZE OF SQUARE TIN BOX.

and at a corresponding reduction in price. I really think that such combs might be packed in the Russian tin boxes with clear conscience with the somewhat injured side down and sold as Fancy honey. Are you not personally fully satisfied that the honey is pure and identical in quality with the other, the only difference being in the fact that its appearance is not exactly the same? Of course, if such combs turn out to be light in weight, some extracted honey must be poured into the bottom of the box or some honeycomb cells inserted.

When the season is good, comb honey in sections does very well. But let us look at the other side of this matter. Let us as-

sume that the cost of the boxes will more than repay itself. You must add to this the saving in not requiring sections, separators, or fences.

With regard to the packing of such boxes for shipment, this method is still more convenient than shipping in sections. Because of the regular form of the boxes they are easily packed in cases, take up little space; breakage and leakage are done away with, something that is to be feared in shipping sections.

To be exact, I may add that Russian beekeepers use also plain unlithographed boxes, having plain labels on the outside. Of course, they do not look as pretty as the



others. Cardboard boxes inlaid with wax paper are also used, but they are not reliable for shipping.

I must now consider the last point, namely, the sale of honey. I am well aware of the fact that the bee-keepers of the United States worry over the disposal of their product. It seems that not all succeed in selling their honey easily, rapidly, and advantageously. What are the reasons for this? Certainly not overproduction. This does not exist in any country under the sun, and surely not in this country. There are hundreds of thousands, nay, almost millions of families, which are totally unacquainted with the taste of honey; others may know it, but have had it presented to them in such a shape that they prefer corn syrup. The duty of acquainting the population of all classes with the products of our apiaries is incumbent upon the bee-keepers themselves. It is their duty to show that honey is extremely wholesome and useful. It is the duty of bee-keepers to teach families to consider honey not merely in the light of a dainty, but as a necessary article of food. One of the principal requirements for the booming of any article is the presentation of it to the consumer in good quality and the most attractive form. Honey is no exception to this rule. Probably the principal part in the popularization of honey must be played by those bee-keepers or retail dealers who peddle the honey from house to house. The success of these people depends upon their own ability and cleverness. In order to obtain a large circle of customers they must not only give a half-way decent, but a very attractive appearance to their wares. I remember what a Russian bee-keeper said on the subject: "What's the use," he said, "of going fishing without bait? Not a sucker will catch on to a bare hook for his particular pleasure any more than he would walk ashore and jump into the frying-pan." Mr. Smith was perfectly right in his remarks made in the *Bee-keeper's Review*, when he said:

Don't ask them if, they "want to buy some honey." Of course they don't until you make them want what you have, and then they will buy without asking.

Honey packed in such attractive boxes will prove a sufficient bait for the buyer, and may be its own inducement for him to purchase it.

It is to be regretted that the illustrations can not convey an adequate idea of the striking appearance and the richness of coloring of the boxes in reality, for they are really beautiful articles, and the best confectioners and stores in the Russian capitals are not above carrying them. These boxes are as convenient as they are pretty. They may be properly served on the table without removing the honey. If their contents have been only partly used, the remainder may be very conveniently set aside for future use, the boxes being provided with hinged lids, which may be easily opened or closed. Neither dust nor the bothersome flies can get at them. Honey in this shape makes a

nice present for children, or adult friends and relatives. It may be easily taken along on a trip or for picnics, where it is bound to be an attractive ornament of the improvised table.

In conclusion I would say that what I have written was not with the object of filling up space in this journal. I desire that this method of producing and packing honey be adopted. The fact that the suggestion comes from Russia will do no harm. I am sure that you will approve it, once you have tried it.

[This method of putting up comb honey has much to recommend it, and could it once get a foothold in this country it might help the bee-keeper who has difficulty in producing a Fancy or No. 1 comb honey to get a fancy price for his product put up in this form. At all events it strikes me as being the best solution of the chunk-honey problem. It would have all its advantages with none of the bad features. The rapidly increasing scarcity of basswood for sections may in time force us to adopt something of this kind.—Ed.]

#### QUEENS MATING MORE THAN ONCE.

Evidence that They Do; Overstocking; Priority Rights to Location; Baby Nuclei—a Caution Concerning.

BY J. E. CHAMBERS.

In GLEANINGS during the past year I have noted many things of uncommon interest to me. As a specialist I have been more interested, perhaps, than some who keep bees only as a side issue. Nevertheless, I am persuaded that the subjects under the above heading possess an abiding interest to many besides myself. This belief has induced me to undertake the task of telling the results of my own observations, along with other things as they appear to my mind. For quite a long time after reading the articles of Prof. Benton and others regarding the second mating of queens, I had my doubts, thinking that perhaps a mistake had been made in some or all of the observations mentioned. However, within the last month some things have come under my notice that incline me to change my opinion very materially, and to place no manner of doubt on the assertion that they do sometimes, at least, mate more than once. It is true that, in this particular case, I did not note any indication of a second mating; but I did observe two succeeding flights of at least ten minutes' duration, and I am seriously of the opinion that she did not fly out these two last times for an airing, nor for wing exercise. The circumstances connected with these observations were such that all my faculties were under requisition, and I know positively that no mistake was possible.

On the 25th of last September I sold a friend a very fine and promising young Carniolan breeder—such a queen as I had never seen before, and bees the gentlest I have

known. Being desirous of saving some of her stock I fed her colony very liberally during the time of cell-building; and when the cells were ready to hatch I distributed them among nuclei except one left in the parent hive. Drones being scarce in my home yard, I secured about 100 fine big fellows, all hand-picked from an outyard. These I gave to queenless bees that were being fed nightly. I now fully expected to secure a good number of choice matings; but if any mated except the queen in the old hive I am sure I never knew it; yet my observations were very close. However, on the fifth day after hatching, this queen flew out, and, on returning, brought the drone organ with her. When she had gone into the hive, and the bees were somewhat quieted, I opened the hive and found the male organ still remaining, but protruding considerably from the vagina, which convinced me that it was no false contact but a true connection. I now felt that I had one of these choice queens safely mated; but imagine my surprise the next day, when, standing by this same hive, quite by accident as it were, to see this identical queen emerge from the hive and fly directly away, returning in about ten minutes, with no signs of having met a drone. I now had my curiosity fully aroused, and proceeded to watch for her on the succeeding day, and, lo! she appeared again and flew out, but returned the same as before. After that she flew no more, though a strict watch was kept for some days in order to determine this fact. I fully expected to see her deposit a few eggs in the center of the brood-nest, especially as the bees seemed to have prepared quite a large space for her, polishing the cells and refusing to store any honey in them; but up to the present time, seven days after mating, there is no sign of eggs in any part of the combs, and the queen has shown no increase in size; she also maintains all the excitable shy appearance common to virgins. I fully believe this mating failed to do the work of fecundation, and, while still under the unsatisfied sexual impulse, she flew out a second and a third time, failing to meet a drone on these trips solely on account of their great scarcity; but after the second failure the impulse to mate wore off, and of course she did not go out after that. This colony is in good condition, and will winter, I am sure, and will be under the closest observation next spring in order to see what the final result will be. If she should fail to lay in the spring, which I fully expect, or if she should prove to be a drone-layer, it would confirm my belief that, in order to be fully effective, the sexual organ of the drone must be absorbed into the body of the queen. On the other hand, if she should prove to be all right it would go far to establish the belief that a queen might mate several times, either of which matings might or might not be effective.

The fact that men of high intelligence are willing to go on record as declaring that overstocking is a thing not to be feared is,

to say the least, astonishing. I have for several years been in a most favorable position to learn something about this question. For three years past I have established one new yard each year, taking from 25 to 40 old colonies to start with. These new yards have never contained more than 60 colonies during the first season, and, without exception, have always yielded a third more profit than any of the old established apiaries. The present year, though a very hard one, well illustrates this fact. One of these new apiaries had only 40 colonies in it, and none of them of more than moderate strength; yet the yield was nearly 70 lbs. per colony, while those in larger apiaries, and four miles away, did not average 20 lbs. The forage was the same in both places. Closely observing both yards it was readily apparent that the weaker colonies, in the new yard, were working much the stronger force, and continued to do so for a greater number of hours each day, up to the last day of the flow. From the time the first bees began to go out in the morning until they were returning in good force did not exceed five minutes, and this was kept up throughout the day in the large yards. The first bees returned in an equally short time; but inside of two hours the working force showed a big weakening, and by two o'clock in the afternoon they had almost quit work for the day, while those in the smaller yards continued with almost the same force until night put an end to their labors. This fully satisfied me that lack of nectar to gather was the cause of this suspension of bee labor. I am also satisfied that the larger force of bees, in the big yards, was compelled to work over the flowers many times, and that this increased the length of time necessary to make a trip, and, of course, diminished the yield; whereas those in smaller yards never had to work the same bloom twice, and, of course, could get honey for a greater length of time each day. This condition would not be so noticeable in good years; yet if the field were sufficiently overstocked I am sure it would make itself felt. But the danger from this source is not so much to be dreaded in good years, when some surplus may be had, even at the very worst; but in poor years it might make feeding for winter stores a necessity. I don't know how others regard it; but with me it is a real and decidedly apparent factor.

Priority rights in regard to location is, to my mind, a real and menacing question for the specialist; and if it can not be settled satisfactorily, the occupation of the bee-keeping specialist in many localities is as good as gone; but if it can be settled in a way to protect those who are depending on bee-keeping for a living, then it will tend to place the pursuit on a higher plane and on more solid ground. What hope or what prospect is there for a man with ability, energy, and patient perseverance, all of which are requisite in successful bee-keeping, to start apiaries and work for years to build up a trade, only to wake up some morning



and find the work of his life broken into by some Jack of all trades? To my mind there is nothing more hurtful than the arguments advanced by some writers in defense of this species of brigandage. I think our associations should take some action on the question, and, by severely condemning the practice of encroaching on the territory of those who are already established, set a moral example and a precedent.

Another thing I wish especially to speak of is the mating of queens in the so-called baby nuclei. I myself have mated them in small nuclei like those spoken of, but they require a good deal of watching, and more skill than the larger nuclei, and the young queens can not be kept for a considerable time without special care. I find it absolutely necessary to keep queens on hand at any time ready to replace a played-out or poor queen with, and I think most bee-keepers find it profitable to do likewise. For this class of bee-keepers the baby is not of much value, and I am sure it is a mistake to recommend it to any but those who possess considerable skill in handling and rearing queens—not that it can not be used to good advantage by the large bee-keeper who has the requisite patience and skill; but a great many, indeed, can not hope to succeed with it, and it is not right to urge this class to waste time and money with it. I should not have mentioned this, but I feel sure, from the prominence given it of late, that a good many will be induced to try it; and you know as well as I do, or even better, that, in many cases, failure is assured, and at best it is of doubtful value to the honey-producer who has no great skill in queen breeding and mating.

#### OBJECTIONS TO A BROOD-NEST TOO SHALLOW.

Another thing I wish to call your attention to. In your footnote to my article in the July 1st issue of GLEANINGS you say if two bodies are used it would obviate some of the objections; but you fail to state what, in your opinion, the objections are. However, I presume that you imagine the queen would lay in the sections, and that pollen would be stored there, and, being too small for a brood-nest, would cause dwindling of the working force; and, indeed, this would be the case if a good many of the fellows who write had to manipulate the colony, both before and after its preparation for comb-honey work; but in my whole experience and practice it has never been the case, even once. There might be something in locality in this respect, but I doubt it. I think there is more in the man and his way of doing things. However, I can not explain in this article.

Vigo, Texas.

[If overstocking has been seriously advocated in these columns, without a protest, I did not know it or had overlooked it. I have frequently said that, in many localities I had visited, too many bees were plainly responsible for cutting down the honey-yields to an extent that was almost alarm-

ing. As I said to friend Doolittle in our issue for Dec. 1, such references ought to be accompanied by the page and issue of the journal in order that we may see exactly what is said.

It may be that a caution is needed in regard to the use of baby nuclei for keeping queens. Our use of them has been confined entirely to the matter of having them mated. As soon as they were surely laying they were taken and another virgin would be given them. We have never tried them for keeping queens for any great length of time.

Regarding the use of two shallow brood-nests, you in your last paragraph have anticipated the objections I had in mind. In some localities, and particularly with some bee-keepers, the pollen difficulty is a serious one. Even Dr. Miller has complained that a brood-nest as deep as the present Danzenbaker caused pollen to be forced up into the sections.—ED.]

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### THE WINGS OF THE BEE.

#### I.—The Evolution of the Venation.

BY E. F. PHILLIPS, PH.D.

Careful students of insect life have recognized that the veins of the wings of various insects resemble each other; and numerous efforts have been made to refer the wings of all orders back to a hypothetical type. According to the theory of evolution, all forms of insects have probably descended from one species; and the effort has been made to discover, if possible, what the wings of this primitive form were, so that we can more nearly discover the relationships existing between the forms living to-day. There are certain features in the venation of the wings of insects which occur in all the more generalized species, so that we are warranted in regarding them as typical of all insect wings, and therefore probably inherited from the hypothetical ancestors of the insects now living. Veins of the wings are of special interest to the entomologist, since they are useful in so many cases in identifying species; and for this reason the veins have been much studied. It is scarcely necessary to add that we shall probably never know very much about the ancestors of insects; but any evidence which can be found by comparing the forms now living are of great value in studying new forms.

Comstock and Needham, in the *American Naturalist* for 1898, in a very excellent series of articles discuss the relationships of the venations of the different insect orders; and to these articles the reader is referred for additional information. I can at this time present only the changes which have taken place in the evolution of the wing of the bee from the typical form.

The typical insect wing is supported by the following veins, beginning at the anterior edge: Costa, *C*; sub-costa, *Sc*; radius, *R*; media, *M*; cubitus, *Cu*; and several anal

veins, *A*. These are often branched, the branches being numbered in order; thus, the first branch of the vein radius being known as radius-one, *R*<sub>1</sub>. The space between veins is known as a *cell*, and is named from the vein which forms its front margin; thus, the space just behind the vein radius-one is

pose. The flies have but one pair of wings, of such a width that they support the weight of the insect in flight. Had the bee wings of this type they would need to be about  $\frac{2}{3}$  of an inch from point to point when at rest, and this would have prevented its entrance to its own cell. We frequently see bees at

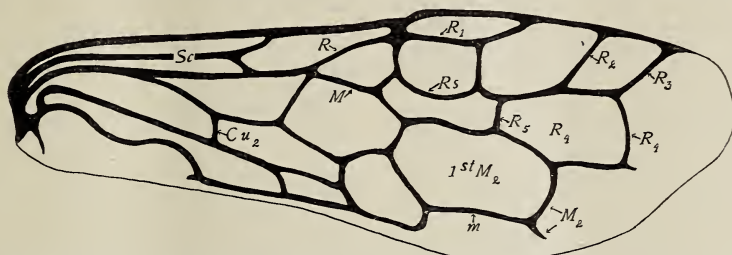


FIG. 1.—THE WING OF A TYPICAL HYMENOPTEROUS INSECT, ACCORDING TO COMSTOCK AND NEEDHAM.

known as the cell *R*<sub>1</sub>. Numerous cross-veins are found which are represented by small letters; thus, the cross-vein connecting *R* and *M* is the radio-medial (*r-m*).

Fig. 1 represents the wing of the typical insect belonging to the *Hymenoptera* (the order to which the bee belongs). No species of insect has a wing just like this; but a study of many species has indicated that

the entrance with the wings held like the wings of a fly. The special adaptation of the wings like those of the bee is the row of hooks, or hamuli, which are located on the anterior edge of the hind wing. When the wings are adjusted for flight these hooks fit into a fold in the fore wing called the *plait*, and the insect has then practically a single wing surface on each side of the body. This

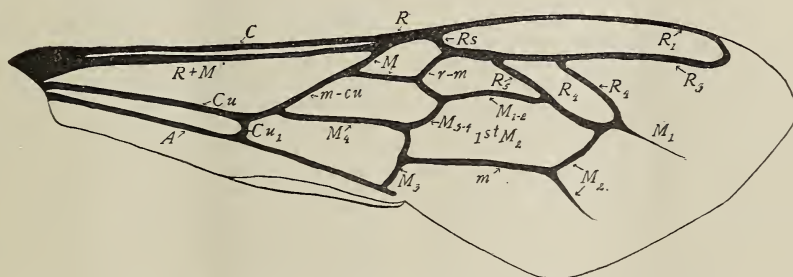


FIG. 2.—THE FORE WING OF THE HONEY-BEE WITH THE MAIN VEINS AND CELLS LABELED.

the ancestral form had a wing of this kind. The saw-flies come nearest to the type in this order. To follow out all the changes which have taken place in the formation of this wing would require considerable space, so that we must omit the discussion here.

Fig. 2 represents the fore wing of the honey-bee with most of the veins and cells marked. In the evolution of this wing three veins have been entirely lost—the sub-costal (*Sc*), radius-two (*R*<sub>2</sub>), and cubitus-two (*Cu*<sub>2</sub>). In examining over one thousand wings, no cases were found in which any of these veins were present. The angles of the branches of the radius vein are also changed considerably. The veins *R* and *M* coalesce, and lie very near to the vein *C*, forming a rigid anterior edge. There is here also but one anal vein.

In the case of the bee we get a remarkable case of adaptation to environment in the way in which the wings are placed in re-

gives much more power and regularity to the flight of the bee than would be obtained if the two pairs of wings acted independently. The number of these hooks is from 16 to 27, the average for drones being slightly higher than for workers, and the variation in number being far greater for drones.

When at rest the wings overlap and lie close to the body. In the wasps the wings at rest are confined to a still smaller space by being folded lengthwise.

Philadelphia, Pa.

### JUDGING HONEY AT FAIRS.

Criticisms on Some Queer Judging.

BY A SUBSCRIBER.

Recently I was at a fair and watched the judging of the honey exhibits, but was not myself a competitor. The judge was a very



careful and impartial man, and he went over the exhibits very carefully several times before giving the awards. So far as I could observe, the honey was judged almost entirely by its flavor, although the aroma received some consideration, and the appearance also was noted. This refers to extracted honey.

When the judge came to the comb honey I was almost knocked down with astonishment to see him break holes in beautiful white sections in order to taste their contents. The appearance of the exhibits was thus entirely ruined. According to my own ideas, comb honey should be judged by appearance only. The wholesale purchaser and the consumer, both of them, pay for the article according to its appearance. The best-filled sections, and those with the whitest cappings, are the ones that command the highest price, no matter who it is that is buying. A purchaser of comb honey does not ask to be allowed to taste the article, and he would not be allowed to do so, even if he did ask; therefore is it not reasonable that it should be judged according to the way in which it is sold, and be judged by its appearance only?

If I were judging I would give most points to smooth, well-filled combs. Such sections, with no pop-holes—well filled solid to the wood, and every cell sealed—would be placed above those which might be a little whiter in color, yet having a few cells not sealed over.

I would place the whiteness of the cappings second, and the cleanness and whiteness of the section itself third. Flavor I would not consider at all. We must remember that it is necessary to please the eye first, if we would draw from the pocket of a consumer. These conclusions are borne out by the grading-rules you publish in each issue of this paper. I can not help saying again that it seems to me a very strange proceeding to break open a section and judge by its contents.

As regards judging extracted honey, I would put appearance first, flavor second, density and weight third, and aroma fourth. A purchaser in a store would take a bottle of clear white honey in preference to a dark-colored one. The lighter the color, the more attractive to the eye; and, as before mentioned, it is generally the eye that controls the pocket. This is also proved by the market quotations you publish. I copy the market quotations from the last number of GLEANINGS I have received:

BUFFALO.—Fancy white comb, 14 @ 15; A No. 1, 13 @ 14; No. 1, 12 @ 13; No. 2, 11 @ 12; No. 3, 10 @ 11; No. 1 dark, 11 @ 12; No. 2 dark, 10 @ 12. Fancy white extracted, 6½ @ 7; amber, 5½ @ 6; dark, 5 @ 5½.

The above proves my claims. Very few retail purchasers would ask to taste even the extracted honey, and fewer still would be gratified.

As regards the third point, all bee-keepers agree that a heavy-bodied well-ripened honey is the best. I might almost say the heavier weight would be given preference

to a lighter-colored honey that is lighter in weight; and all agree that thin unripe honey should not be placed on the market at all. The aroma is the last thing a buyer would think about.

Another feature about this fair that I noticed was that there were no samples of granulated honey exhibited. There were only two classes—extracted honey and comb honey. This year the exhibits were all liquid, but other years I have seen samples of both liquid and granulated honey competing in the same class.

Now, for my part I do not see how it would be possible for any man to judge both together. I have in my possession at the present moment some granulated honey as hard and solid as any cheese. It is now, in the crystallized state, as white as any sugar; yet when it was in a liquid condition it was very dark and cloudy. How, then, could this be judged with the liquid article? There are three very good reasons why I should not be expected to reduce this honey again to a liquid state. First, because the necessary heating would injure it more or less in color, flavor, and aroma; second, because most people prefer honey in the crystallized or granulated condition; third, because granulation is an absolute proof of purity.

I intend, therefore, to request the committee to place these classes of honey on their next program, to read thus:

Class No. —, comb honey in sections.

Class No. —, extracted honey, liquid.

Class No. —, extracted honey, granu'ed.

The judge referred to above is a grocer by trade. He is a thoroughly honest, impartial man, and, without doubt, an experienced taster. At the same time, however, he knows nothing whatever about how honey is produced, nor any of the fine points on which bee-keepers place the most value. Would it not be more satisfactory to exhibitors if a judge could be obtained who has had several years' experience as a modern bee-keeper?

Fernhill, Napier, N. Z., Oct. 30, 1904.

[I don't know much about judging honey, but so far as I can see your points are all very well taken. It may be permissible, if a judge desires it, to taste comb honey from the same super, but he should not mutilate those perfect sections on exhibition, especially if the exhibit is to stand after the premiums are awarded.—Ed.]

#### THE DANZENBAKER HIVE FOR THE PRODUCTION OF HONEY.

Should the Brood-nest be Crowded with Brood?

Some Comments on a Recent Article by Mr. Doolittle.

BY WM. A. STEWART.

Mr. Root:—I have often thought of writing you something of our experience with the Danzenbaker hive; and after reading Mr. Doolittle's letter in the Oct. 1st issue I decided to do so, for I think your readers have not been fully informed as to its merits.

Mr. Doolittle says, page 925, "The brood-combs are manipulated till the whole are solid full of brood; and when in this shape, if any honey is stored it must go into the sections." Now, I do not want the brood-combs *quite* in that shape, for four reasons:

1. The manipulation above referred to takes time from the bees as well as from the bee-keeper.

2. I want a little unsealed honey in the frames—enough for the brood for a day or two at least, so the young or nurse bees will not have to go into the supers for it, where, in some cases, they would have to climb up over nearly finished sections to reach the fresh honey above.

3. With the best queens obtainable, there will always be a difference in the capacity of individuals, and I want more room so that an extra good one will never be crowded.

4. With the brood-combs solid full of brood (I suppose he meant to include the usual supply of pollen), what is to become of the *extra* supply of pollen which the bees often gather right in the height of the season? Will it not go into the sections also, or, more likely, crowd the queen into a still smaller space? Granted that it may all be needed later, we must have room for it when it comes. For these reasons I want no contraction of the brood-nest during the honey-flow.

Perhaps you would say that a beginner of two years' experience should hardly speak on matters like this, after Mr. Doolittle has spoken. No one feels that more than I; but I want to say that another experienced bee-keeper, one who seldom speaks for himself, has a plan which suits me better, because it accomplishes the same purpose without these objections.

Mr. Danzenbaker's plan was to make a hive neither large nor small, but of the ordinary size, and of such shape that the natural place for the honey is in the supers, so that the bees will incline to put it there without being forced to do so, leaving the queen plenty of room, with food supplies for the brood right at hand. I want to emphasize the fact as we find it, that *he did what he started out to do*. In fact, it is a matter of practical experience with us that he builded better than he has ever dared to claim. I find no need to tier up the hives with second hive-bodies, except where increase is wanted. I just put on the super with full sheets as soon as the bees begin to carry honey faster than they use it, about the beginning of apple-bloom, and add more supers on top as they are needed. The bees and the hive do the rest.

In the two last seasons my sister and I have secured an average of comb honey per colony nearly equal to Mr. Doolittle's record, and have increased from 5 colonies in the spring of 1903 to 22 now, and have had but three natural swarms, all of them due to overcrowding. I expect to find swarming entirely avoidable; but please bear in mind, after Dr. Miller's experience, that I have no non-swarming race.

Just one more point for the hive. We have a good honey-flow, but a climate so changeable and uncertain that such methods as the brushed swarm—well, anybody may try it who wants to. This county, with no cities and but two large towns, does not nearly produce its own supply of honey, and they don't eat it on the Texas plan either. Let the out-apiary men come; but let them come warned, for they will wish some wet morning that they had shaken themselves instead of their bees. Well, with the Danzenbaker hive I find it perfectly practicable to keep the bees ready for a honey-flow or ready for a famine from the beginning of apple-bloom until the end of buckwheat-bloom in September. Even our nuclei are kept with a supply of honey in their frames, and we can make two from a strong colony without seriously decreasing its yield of honey.

Allow me to add that we have had some of our best points on bee-keeping from Mr. Doolittle, and nearly all of them from your publications.

Elkin, Pa., Oct. 6, 1904.

#### HOW I MANAGE SWARMING WITH THE QUEEN-TRAP.

BY C. H. DIBBERN.

Having established an out-apiary some twelve years ago, and being short of help, I found the swarming business a pretty serious problem. I studied all known methods to prevent or control swarming, including the now popular method of clipping the queen's wings and making swarms by the shake or brush systems. These, however, soon proved unsatisfactory to me, and my first experience with the Alley trap, drone and queen guards, and various so-called self-hivers in the end proved equally unsatisfactory. But from the experience I had, I felt sure that the trap, when improved, was the best way to manage swarming, especially at an out-apiary where but one or two visits a week could be made. I made three or four different traps, but soon discarded all but the one on page 806; and after having had it in constant use for over ten years I do not see how any thing better could be desired.

About the time swarms begin to issue I go through the apiary when the bees are busy, and place a trap on every hive liable to swarm. This I determine from the way the bees are acting, and seldom make a mistake; but with plenty of traps one can be put on every hive. The bees soon become used to them, and I never could see that it made any difference in the amount of honey gathered. In two days there will be a good many drones in the traps, and these I shake out into a box, always keeping a lookout for queens. Should a queen be found, then probably a swarm has issued and returned unseen, or the bees are superseding their queen. In either case the hive should be opened, and actual conditions ascertained. If it is found



the bees had attempted swarming, the swarm can be shaken out, giving it the trapped queen. In an out-apiary, usually a glance at the hives will show by clusters of bees on the upper corners of the trap, just where swarms have issued. If one is present it is a very easy matter to hive the swarm. All that is necessary is to see that the queen is in the trap, which can easily be done if the new Tinker zinc is used. Set the new hive in the place where the old one stood; attach the trap and open the back door so the queen can run in with the bees when the swarm returns. Usually the bees will miss their queen in ten or fifteen minutes; but I have known them to settle on a tree and stay for hours. Generally one can be certain that no queen is present if they cluster on a tree, by that nervous movement among them, and by seeing a few bees flying around under the trees, as if hunting for something. After the bees are hived I leave the trap on the new hive for two or three days, to prevent desertion. Sometimes swarms will come out after being hived a day or two, and start for the woods. It is a great satisfaction to see them humbly returning in a short time.

I am well aware that most of this is no news to the experienced apiarist; but to the beginner and farmer bee-keeper it ought to be of value. When I read last year of the thousands of swarms roaming over the country I thought how easily this great loss could have been prevented with the new queen-trap. This is by no means all the use I make of the trap, and I will have something more to say in a future article.

Milan, Ill.

### LIZARDS AND BEES.

The Small Lizards Friends and Not Enemies;  
Some Noxious Spiders in California; an  
Interesting Nature Study.

BY C. W. DAYTON.

The lizard described on page 658 as "at least a foot long" is an entirely different kind of reptile from the one referred to in your footnote as being "very tame," or the one that "would rather watch the apiarist," mentioned on page 981. The lizard "a foot long" does not possess either of these traits. When this lizard sees a person it gets out of sight as soon as possible, but would eat bees as soon as not. It crawls over the ground leaving a crooked track like a snake, except that it has four feet to help propel its body along, and lives mostly under ground, while the other lizard lives mostly above ground. The "tame" or smaller kind seldom attain to a length of 8 inches, and do not crawl, but hop over the ground as clearly as a bird, leaving only the prints of its feet. It can climb up the side of an unpainted building, but the larger lizard can not. The small lizard can creep to within about three inches of a house-fly, and, by a flying jump, take in the fly before it can move; but the larger lizard must restrict its

operations to a less wary kind of prey—a honey-bee, for instance.

The small lizard I consider a very good friend of the bee-keeper, unless, perhaps, they might become too numerous. Then they might possibly learn to eat bees on account of a scarcity of other insects. But I have watched them for over ten years, and only once have I seen one molest a bee, and that was owing to peculiar circumstances.

I have never seen a cat that would not catch a lizard of the small kind as soon as it would a mouse; but cats do not catch the larger one more than once or twice before they pay no more attention to them. Chickens will catch either kind whenever they can. But if the apiarist has no chickens or cats, let him place a warm board (either soft wood or a board which has some fuzz on it) on the ground on the warm side of a building, and another board on top of this, but separated by  $\frac{1}{2}$  or  $\frac{3}{8}$  inch blocks. Then place around three sides a rim to close the cracks up except on one side, which should be left open for the lizards to creep in. This will soon be used by all the lizards on the place as a roosting-place. As lizards hibernate through the night, in the early morning the top board can be lifted and the lizards picked up in a dormant state unless it should chance to be an unusually hot night.

To show how the lizard may be a friend to the apiarist I will describe a few instances.

For two or three months last summer there was a lizard which came into the house regularly between noon and one o'clock to catch flies and ants from the floor. There was a very industrious nest of ants located about thirty feet from the house, which formed a black line of foragers to the porch, and went up one of the porch-posts and down a wire into our wire-screened safe for fruit. I put tar on the wire, and then they marched in across the kitchen floor to a can of honey that was there for use on the table. Whenever honey was drawn into a dish a little would stick to the cap, and thus attract the ants. I noticed that, when the lizard caught a fly, it always turned and picked up from two to four ants, so I made him welcome. At the end of five or six weeks the ants seemed to be entirely cleaned out.

At another time an open five-gallon can of granulated honey was set on the stove to melt. A coarse cloth was thrown over it to keep robber bees out. The honey boiled up suddenly on one side and oozed through the meshes of the cloth. As I was at the dinner-table the honey was set off the stove on the floor a few feet from my chair, and about a dozen flies and five or six robber bees pounced upon the oozed honey at once. The lizard came in as usual, and immediately hopped up on the cloth among the bees and flies, and, after catching a dozen flies and not molesting a single bee, it climbed down as quietly as it came in, and disappeared out the door.

Although these lizards eat house-flies and ants, yet they prefer the larger flies, spi-

ders, cockroaches, crickets, moths, canker and cut worms, and grasshoppers, all of which I have often seen them catch.

At the apiary, in the mountains, near the town of Chatsworth, it being a somewhat desertlike locality, spiders are scarce, I suppose because flies are scarce. There is one representative, however, and this of an unusual size, being about  $\frac{5}{8}$  or  $\frac{3}{4}$  of an inch in length. It spins webs like a bunch of cotton, only to hide in. It approaches its prey stealthily, and springs upon it unawares. If it were not for lizards these spiders might become a formidable enemy to bees.

At Florence, forty miles away, and in the damper coast atmosphere, we are troubled by at least three varieties of spiders. Our hive-covers being of the ventilated kind, in the spaces two kinds of spiders establish their homes. The small one is not more than  $\frac{1}{4}$  inch long, and lives on flies; but it often spins its webs before the entrances of the hives, and entangles the bees; but its webs not being strong the bees usually kick themselves free. The other spider is about  $\frac{5}{8}$  inch long, and has a bright-red spot on its thorax. This one makes a business of eating bees, and a bee seldom gets out of its net if once entangled. I often find its web before the entrance, so as to make it almost impossible for a bee to enter. It also constructs a mass of webs like a small bunch of cotton, with an entrance on one side, in which it hides from its enemies. I have seen lizards pull at one of these nests until the spider ran out and then catch it.

But last of all is the worst spider of all. This one is brown all over, and its body is about  $\frac{3}{4}$  inch in diameter when full grown, and has a small thorax, and head attached to one side. This spider does not spin a web to hide in, but secludes itself by creeping closely into a corner and depending upon its resemblance to the surrounding material. Thus on a dark surface it may be of a dark-gray brown; on redwood, the exact color of the wood, while on a brick its back would be a red brown. As soon as night comes, this spider begins by casting a web from the eaves of the building under which it is secreted all day, to the branch of a tree—often from the ridge-board or chimney—to other parts of the house. In my apiary were 150 grapevine-trellises, eight feet high, and rows of trees around the outside, making good facilities for attaching their webs. They do not weave a net, but cast five or six threads near by, with one or two extending to a distant object. These webs are strong, and very sticky. When an insect strikes a single strand its fate is fixed. They will hold a bee by a single foot or the end of a wing, and it is only a few seconds until several feet and wings are caught. As the bee struggles, the single strand separates into several fine strands which have the quality of finally inclosing a bee so thoroughly that it is difficult to determine whether it is a bee or some other insect. The spiders remain secluded until about sunset, and then draw in the webs,

which they devour, together with bees, flies, and other insects. During the following night they arrange more webs. I have often found five or six bees in the web of a single spider. Those which are caught are the earliest and most industrious bees, as one or two hours of sunshine dries the stickiness out of the webs so that they are entirely harmless.

There are several buildings adjacent to the apiary; and, after an absence of a month, I have found more than a hundred of these big fat spiders located about them, but never one below the eaves within reach of the lizards. Lizards regard them as such a rare delicacy that they are taken before they are half grown. I go at the high fellows with a board about four inches wide, and a handle on one end, and land a good number clear over into the street or against another building "on the fly." The greater part of them can be crushed in their hiding-places in daytime; but a few secrete themselves in inaccessible places, which can be poisoned by dusting a small amount of Paris green on a captured insect or on a moist web.

At one time these spiders became so numerous, and were so persistent, that I began to despair of maintaining the apiary in that location. Before my courage entirely failed we sold the chickens, and the old cat died, which allowed the lizards to increase so that the spiders have hardly needed any of my attention during the past summer.

Chatsworth, Cal., Nov. 10.

#### HOFFMAN FRAME AND FOLLOWER DEFENDED.

How the Frame Should be Used.

BY M. A. GILL.

I have watched with a great deal of interest the criticisms upon the Hoffman frame during the past year, and am wondering if the words of condemnation heaped upon it by the so-called experts would cause the manufacturers to stop making them and take a step backward by again offering to the trade that old nuisance the finger-spaced frame. As one who is handling 1000 colonies in Hoffman frames and about 200 with the old finger-spaced frames, I can not understand how any one can claim that the latter can be handled with more ease and speed. Three of us go over this amount of bees every six days during the swarming season, controlling all swarming by the shaking plan; and I know we could not do it with the old loose hanging frames, nor do I believe any other three people can if they will agree to keep their combs as straight as we do with the Hoffman frame.

Now, this may sound harsh; but I think if some of the people who are so severe in their criticisms of the Hoffman frame could attend your correspondence school for a year and learn how to have combs built in Hoffman frames, and how to manipulate them



after they are built, they would cease their criticisms. I know of one bee-keeper who says he prefers the Hoffman frame, but prefers to leave out the follower, and then spaces the frames clear across the hive. Could any thing be imagined more ridiculous?

Another prefers to push the follower and half of the frame to one side of the hive and allow the bees to build one thick comb in the center to enable the operator to have one place of easy access.

Still another prefers to leave out the followers and allow the bees to build a thick comb at the side of the hive; but they generally build in a one-sided slab of honey that is attached to the side of the hive and then bridged across.

You see in every case they entirely lose the Hoffman feature. Many people have a great deal of trouble with the hive-follower, and some entirely condemn it.

Because the ten-frame hive as put upon the market is made so a follower can not be used, is that any thing against the follower? Because some people push the follower over against the side of the hive and allow the bees to glue it fast there, is that any thing against the follower? In the one case it's because the manufacturer does not allow enough room to use a follower, and in the other case the operator doesn't know how to use a good thing when he has it.

I know of many bee-keepers who work for comb honey, and it matters not what kind of hive or frame they have; if you want to examine one of their colonies you need a kit of burglar tools and the patience of Job to get into one of them at all.

Why do not bee-keepers, it matters not whether they are large or small producers, put their fixtures, their whole plant, it may be called, in working order at least once a year? What would be thought of a manufacturer who would allow the sawdust, bark, and edgings to fill up among his belts and wheels and stay there year after year? or the railroad companies who would allow the brakes on the cars to go dragging, and grass and weeds to grow across the tracks? There is a difference between fussiness and good order; but every bee-keeper should put his whole fixtures in good working order every spring.

There is one way and only one way to have Hoffman frames satisfactory—that is, to have the combs built with the follower properly adjusted, and the hive sitting level; then, ever afterward, properly adjust the frames and follower after each and every manipulation so as to retain the Hoffman feature, which is, accurate spacing.

I have long since learned that we of the common herd can not get what we want by trying to influence manufacturers; but if I were on a committee to change the Hoffman frame I would only suggest making the end-bars square on both edges, and would insist upon retaining the short rest. The fact is, bee-keepers need fixing over much more than does the Hoffman frame.

El Dorado Spring, Mo.

[As I remember, Mr. J. A. Green and the others who have criticised the Hoffman frame have not complained of it because the principle was not right, but because, in the hands of the inexperienced or careless, it was not handled properly, and therefore was not so good a frame as the ordinary unspaced frame of the Langstroth type.

You emphasize very clearly that there is a *right* way and a *wrong* way to handle the Hoffman frame, and certainly three-fourths of the trouble with the follower may be eliminated if it is left up against the frame and not against the side of the hive.

It is difficult to make a really good thing fool-proof; but I have always felt that the Hoffman frames came nearer to that desideratum than any loose, unspaced frame that was ever devised. It can not be spaced too close, although it may be spaced too wide. In the ten-frame hive there can not be much variation. It must come pretty nearly right. In the eight-frame it will be spaced equally correct providing a follower is used. It can not be any other way. My observation has always been that the inexperienced and careless would space the unspaced frames too close together, with the result that nearly half the capacity of the brood-nest was put out of commission.

We are giving our customers this year the option on a square or V edge; and we expect this year to make more of the square edge than of the V. The square edge will make the Hoffman more fool-proof than ever, because it will not make any difference how the end-bars are put on. They must go right every time.—Ed.

#### “THE HOFFMAN FRAME COME TO STAY.”

“Its Special Adaptation to Incompetent Help in the Apiary.”

BY T. F. BINGHAM.

Being greatly pleased with the above heading, and more pleased and instructed with the management of it, and the indisputable facts brought out by Mr. Editor, I beg a few inches of space in your journal to explain some small points which may not have been very clearly shown.

Mr. Hyde makes his estimates on 1200 colonies of bees, which is a fair number for a yearly experiment. He states that a man can clean from 25 to 50 per day, and ought to get wax enough to pay for his labor. His heading indicates that incompetent labor may have been employed; but as such work was done in the spring, so as to have easy manipulation during the rush season, it would not be unreasonable, considering that the incompetent help should use an incompetent smoker and receive rheumatic hypodermic injections sufficient for a lifetime, added to that perennial pleasure every bee-keeper appreciates, namely, the simple fact that a honey-bee can do it but once.

It would not be unreasonable to estimate such labor at \$2.00 per day, and that 25 col-

onies so cleaned would be a fair day's work. Eight pounds of wax obtained would have a cash value of \$2.00. It would further represent 160 lbs. of choice honey used in making it, worth 10 cts. per lb., or \$16.00. Now add this \$16.00 and the \$2.00 together, and the result is, the incompetent help cost the man who employed him \$18.00 per day, and spent 48 days in getting wax out of the hive and off from the frames, so as to be able to use said hives and the frames that would stay unless so cleaned every spring. It may be a comfort to realize that the wax in the hives pays for the work in cleaning the hives, and that the hives are in order for the busy season, even though it cost \$96.00 to do it; but the estimated consumption of 20 lbs. of choice honey to produce 1 lb. of wax calls us back to figures again.

The whole amount of wax from the 1200 hives would be 384 lbs., which, multiplied by 20, the number of pounds of *niciest* honey (as this extra, which had to be cut out, was stored in the section-honey run) would represent 7680 lbs. While the wax would have been worth \$96.00 at 25 cts. per lb., the honey would, at 10 cts. per lb., have been worth \$768. Now add the \$96.00 that the labor of cleaning represents, and we have \$864 net loss for the privilege and pleasure of using a loose or hanging frame, on the outside of which bees, as Mr. Hyde states, store honey. No bee-keeper who has used hanging frames of the Hoffman or other makes will for a moment question Mr. H.'s statements. They are incontrovertible.

In the years between 1862 and 1865 your correspondent had the pleasure and experience of handling about 300 colonies of Italian bees in the original Langstroth hives. Italian bees were worse about building up into the sections or boxes than now. The extractor had not become generally known, neither comb foundation; and Italian bees, true to their instincts, persisted in doing just what Mr. Hyde vividly portrays.

This not remarkable instinct of bees led your correspondent to construct a hive in 1865 securing the practical advantages of movable combs, and at the same time securing all the honey and combs within the frames and sections, instead of part of it on the outside.

Farwell, Mich.

[The amount of honey to make a pound of wax used to be estimated at 20 lbs.; but later and more reliable experiments where bees have access to the open air show that this figure is altogether too high. Between 4 and 7 lbs. were the figures that were secured, if I remember correctly, so that your estimate ought to be one-fourth as large for the actual amount of honey. Even then you apparently have the best of the argument, providing that Mr. Hyde does not show that your system of shallow frames requiring extra handling of combs piles up the cost in his favor. I do not quite see how your top-bars should be cleaner than those on the thick top-bar of the *regular* Hoffman frame.

But Mr. Hyde uses a *thin* top-bar to all his Hoffmans—the very kind of bar that invites all kinds of burr-combs. If he used the *regular* top-bar he would have far less of wax and scraping.—ED.]

## FOOD COMMISSIONERS AND ADULTERATED HONEY.

How the Innocent May Suffer for the Guilty.

BY L. L. TRAVIS.

It appears to me that Wm. A. Selser strikes a note of timely warning to bee-keepers on page 1063, Nov. 15. According to his theory, and I am of the opinion that he is right in every particular, both honey producers and dealers are running considerable risk in labeling honey "pure." I produce extracted honey exclusively, and have sold tons to the grocery trade in pails and cans, and this fall have put up some in bags. Every package ever sold by me has been labeled "pure," and my warrant was back of it. I have always had the faith to believe that, as long as I put out honey just as it came from the bees, of good body and quality, I was doing an honorable and safe business; but Bro. Selser's article sets me to wondering where I am at. Is it not possible that I have innocently made myself liable to a fine, and also endangered my friends the grocers?

I cite you to a clipping from my county paper to show how the pure-food laws are working in this section:

The firm of Colt & McNamara is among the many hundreds of dealers who have been caught between the dishonest manufacturers and the pure-food agent. Some time ago an agent of the pure-food commission was here and purchased some maple syrup of this firm, and, after an analysis, they sent notice that the maple syrup was not all maple, and that there was a fine of \$50. Mr. McNamara was at Tunkhannock Tuesday, and settled the matter by paying the fine. While this may be a good law it is a rank injustice to Messrs. Colt & McNamara who conduct their store by honest dealing and good goods, and who were assured by the manufacturer that the syrup was the best on the market. There should be some means whereby the maker should suffer instead of the retailer, for impure product.

Now, I believe Messrs Colt & McNamara to be innocent of knowingly selling adulterated goods; but you can see what happened to them. I have always believed that I was putting out pure honey; but since reading Bro. Selser's article there is a question in my mind whether I have or not. Although my honey may seem, both to myself and the consumer, to be all right, is there not a possibility (and I might say a probability) that the bees have put in enough honey-dew or the juice of fruit to condemn it in the eyes of the pure-food officers, and put my customers in the same predicament that Messrs. Colt & McNamara are in?

I dislike to offer any thing for sale that I dare not warrant as strictly pure; but this is a danger that we ordinary bee-keepers can ill afford to assume; and as we are not all of us chemist enough to analyze honey, what shall we do—go to the expense of hav-



ing an expert analyze all our honey, or change our labels?

West Nicholson, Pa., Nov. 28.

[It is true that a hardship is sometimes put on an innocent person who may unwittingly buy honey that has been adulterated by some one else; but if the law were broad enough to allow the seller to escape, the actual adulterator could hide under cover, and keep on with his nefarious business by having a second party dispose of his product. If that second party could escape the clutches of the law by saying that he did not know the honey was adulterated (and he might swear to that on the witness stand), it would leave a great wide gap for fraud. It were better for the innocent to suffer occasionally, in order that the pure-food law should be effective, than to have a law on the statute-books with so wide a loop-hole in it that the intent of it would be entirely nullified.

We came near being held up during the past summer because some honey we sold to some one else had been adulterated *after it* left our hands. The party who sold the goods averred that he bought them originally of the Root Co. We both received notice from the pure-food commissioner not to sell any more of these goods. We insisted that the honey, when it left us was pure, and proved it finally, but not till after a long string of correspondence had passed between us and the food commissioner. As the pure-food laws stand in the various States, it is incumbent on the purchaser of any honey to make very sure that such honey is pure when it leaves his hands. This puts a double check on the adulterator.

I would not leave out the word "Pure" on labels under any consideration.—ED.]



SHAKEN SWARMING A SUCCESS, AND WHEN.

Is "shook" swarming a success in case a man can not be with his bees at swarming? Will the old hive, when removed, stay? and how are the queens fertilized? As I understand, they are fertilized in the air.

WALTER S. BELL.

Mena, Ark., Nov. 6.

[As Dr. Miller has had more experience in handling swarms than we have had here at Medina, I turned this inquiry over to him and he replies:—ED.]

The plan of shaking swarms, so far as it is at all successful, is especially adapted to meet the wants of those who can not have, or do not wish to have, any one on hand to

watch for swarms. Indeed, it may be called anticipatory swarming, the bee-keeper taking the matter into his own hands, and putting the bees in the condition of a swarm before they actually take that step themselves. And yet, having tried it in a number of cases in an out-apiary, I am hardly prepared to say that it is just as easy to get along with in all respects as natural swarming; so if you try it, be on the lookout, for a time, to see whether it exactly fits your case.

There need be no trouble about the old colony, or stump, staying where put. Of course, if any field bees are left in it they will leave and join the swarm, just as they would if it had been a natural swarm; but enough bees should be left with the brood to make sure against any danger from chilling, and the field bees that leave will be more than made up by the rapidly hatching young bees.

The stump colony will rear a queen from the brood present, although it is better to give it a queen or a ripe queen-cell, and the young queen will be fertilized just as in all cases by flying out to meet a drone high in air.

#### FEEDING BEES IN THE CELLAR, ETC.

In wintering bees in a cellar, and their stores being rather scarce, would it be advisable to try to feed them sugar syrup with a division-board feeder between now and spring? In storing them in the cellar, which would be the better—to leave an empty super on to give them plenty of air, or to take it off and put the cover down, closing the brood-frames, allowing a bee-space between them?

A. I. NEFF.

McPherson, Pa., Dec. 12, 1904.

[Sugar syrup may be given to bees in the cellar with the regular division-board feeder of the Doolittle type. It would be advisable, as you suggest, to put the feeder in the middle of the brood-nest; but a better way would be to give the bees cakes of hard candy. The candy should be made by boiling granulated-sugar syrup, with a little honey in it, so that, when cool, it will form into a hard translucent cake. A two or three pound brick of this when put on top of the brood-frames will be enough to take care of any colony short of stores.

The question as to whether the empty super should be put on top will depend largely on the size of the entrance. If it is one inch by the width of the hive, take off the super and put the cover on top next to the frames. If the entrance is only  $\frac{3}{8}$  inch deep it may be advisable to leave the super on, putting in a chaff cushion. In this case the cover should be left off. In the absence of the cushion any old carpeting may do as well.—ED.]

#### HOW TO WASH OUT SECOND-HAND KEROSENE-CANS SO AS TO BE SUITABLE FOR HONEY.

Please tell us how to clean coal-oil cans so that we can use them for honey. Most of

the oil here is sold in five-gallon cans; and, when empty, we can get them for 10c ts. each, good as new, hundreds of them.

PAYETTE VALLEY BEE CO.

Payette, Ida., Dec. 5.

[Second-hand kerosene-cans have been cleaned with strong lye or a solution of caustic potash. The cleaning mixture should be boiling hot when poured into the can. The cans should be shaken violently, emptied out, and then rinsed thoroughly with boiling hot water. We never had any experience ourselves, and therefore feel a little hesitation about recommending second-hand kerosene-cans. Some of our subscribers have tried them to their sorrow. It seems to be very difficult to remove the kerosene odor; as honey is very susceptible to foreign odors, the least trace of kerosene taste or smell practically ruins it for the market, especially if it be fine table honey. After the cans are washed out they should be left out in the sun unstoppered as long as possible before filling them again with honey, for the purpose of letting any kerosene odors that may be in the cans escape.

I think one of our subscribers recommended washing-soda; but whether using soda, caustic potash, or strong lye, one should remember that after a certain number have been washed it is advisable to make an entirely new solution, for the reason that the washing mixture will become impregnated very strongly with kerosene, making a sort of soap.—ED.]

#### PAINT FOR HIVES—WHAT COLOR TO USE.

Part of my hives are painted white and part light blue. I am going to paint them again. Will it make any difference if I paint them all white? Will it embarrass the bees any in finding their own hives if I change the color of them at this time of the year?

JAMES PARKER, SR.

Wabuska, Nev., Dec. 8, 1904.

[It will make no practical difference if you paint all your hives white, even though some of them may now be blue. While there can be no question but that bees recognize color to a very great extent, yet the individual surroundings of a hive would probably be sufficient to enable each bee to recognize its hive, even if the color did change.—ED.]

#### DOES THE USE OF THE PERFORATED ZINC HONEY-BOARD REDUCE THE AMOUNT OF HONEY STORED?

Can we get as much honey if we use the honey-board on the brood-hive all the time? Corona, Cal., Nov. 21.

L. NEWTON.

[By "honey-board" I presume you mean perforated zinc. No; there is no proof as yet that the use of this device in any way curtails the amount of surplus honey. Why should it? True, it puts up a slight obstruction; but with the number of perforations

through which the bees can pass, they ought to store as much with the board on as without.—ED.]

#### INFORMATION WANTED BY THE EDITOR OF ST. NICHOLAS.

For some time I have been endeavoring to advance the claims of honey-bees as an educational ("Nature Study") topic. It seems to me that they are more available, more interesting, and more practical for the schoolroom, and for teachers and pupils outside of the schoolroom, than certain other branches of entomology that have been more talked about and studied by teachers and pupils.

I desire to obtain information of experiences with bees by teachers who have kept bees especially from the "Nature Study" standpoint. Also will young people under eighteen years of age who have personally cared for bees please write me of their experiences?

Any suggestions from veteran bee-keepers for interesting teachers and pupils in bees will be much appreciated.

EDWARD F. BIGELOW,

Lecturer at Teachers' Institutes, and "Nature and Science" Editor of the *St. Nicholas Magazine*.

Stamford, Conn.

[Those in position to furnish the desired information will correspond with Mr. Bigelow direct.—ED.]

#### FAILURE TO CURE; WHAT'S THE TROUBLE?

I have had foul brood among my bees for four years. I can't cure it, except for the time being, by any process.

WM. H. HARLOW.

Mt. Vernon, Ill., Nov. 18.

[If you followed the McEvoy method carefully the disease ought not to reappear. It is my opinion that in administering the treatment you failed to disinfect the smokers and tools, and possibly your own person. Unless the treatment is thorough, every thing disinfected, the disease is quite liable to reappear. In some cases it may be advisable, after giving the treatment, or, rather, before giving it, to burn out the inside of the old hive by holding it momentarily over a bonfire. This will thoroughly disinfect it so that the hive can be given back without any fear of its infecting the bees. In your case I would advise scorching out all the hives as an additional precaution.—ED.]

#### NOISES ABOVE A BEE-CELLAR.

What is your opinion as to the sound of an organ? How will it affect the bees wintering in the cellar under it, only one-inch floor between?

J. BAILEY.

Bracebridge, Ont., Dec. 6.

[Noises above winter repositories do little or no harm. The organ would not interfere in the least.—ED.]



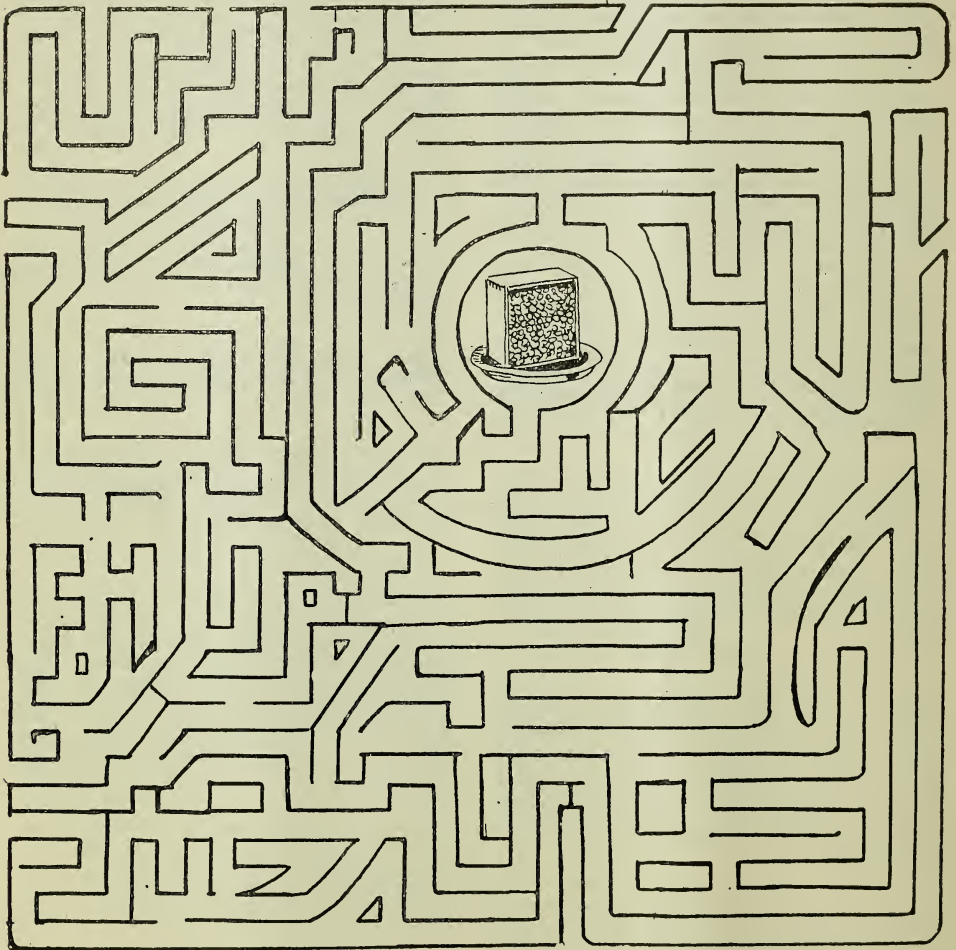
## V VS. SQUARE EDGES ON HOFFMAN FRAMES.

Having read the two articles from Messrs. Hyde and Davenport on Hoffman frames, I add my testimony. I suppose it is unpleasant for you now to go back on that V edge in Hoffman frames after counting on its imagined excellence so long. Well, I found if the frames and hive were not made very exact, after a few years' use, and propolis had accumulated, they would slip past each other, thus reducing the space about  $\frac{1}{4}$  inch. This so often happened, and I had to be so

guarded, that I hated the Hoffman frames worse on account of it; and, having a few frames made at home without the V, I found them much more satisfactory. I have 40 of those hives with supers the same, 10 frames, 11 in. deep, 13 long in brood-chamber, and 12 in the super, with hanging Jones frames in the half of my yards, 250 colonies or so. So, for humanity's sake, do discard the V, and, as you say, make upright bars about  $\frac{3}{8}$  thick.

R. F. WHITESIDE.

Little Britain, Can., Nov. 23.



GET THE SECTION OF HONEY WITHOUT JUMPING OR CLIMBING FENCES.

[We often hear about the royal road to success, as if there were no square turns or re-tracing of steps. Whatever we may say about other things, there is no real short cut to the production of fancy comb honey. The old adage, "Try, try again; if at first you don't succeed," may apply in the case of the fancy honey shown above. Get it? Of course you can if you go along the right way; and you won't have to jump or climb fences either. It may look more difficult than it is, and, again, it may prove more complicated than it seems. Try it.—Ed.]

## IMPRISONING THE ROBBERS.

Last summer, while working with my bees, I had occasion to pass by No. 44, a colony that I had just overhauled, and found that it was being robbed. No. 49 was doing the robbing, and, being a little vexed, I gave them a good smoking and then went to dinner. On returning I found that No. 49 was being robbed by No. 44, and, being afraid others would take a hand in it, I spread a piece of mosquito-bar over each one of them and went on about my work. In about two hours I removed the mosquito-bar and they went on about their legitimate business. I prefer putting the robbers behind the bars (where all thieves ought to be) instead of confining the innocent parties in order to protect them. It causes the robbers to mind their own business, and gives the robbed colony a chance to recover. This, of course, is where there are but two colonies concerned.

A sure way to tell when a colony is being robbed is to examine the bees' honey-sacs as they come out; if they contain ripe honey, it is a case of robbing. In order to find what colony is doing the robbing, examine the honey-sacs of the bees as they rush into their own hives. If their honey-sacs contain ripe honey you have caught the thieves.

F. W. MORTON.

El Dorado Springs, Mo.

## ACREAGE OF ALFALFA NECESSARY TO TAKE CARE OF 50 COLONIES.

The question is asked in GLEANINGS, "How many acres of honey-plant are necessary to take care of 100 colonies of bees?" This being an alfalfa district I thought it would perhaps interest my fellow bee-keepers to state my experience this summer, as the above question has often put me to thinking regarding pasturage.

In partnership with my brother we had 79 colonies, spring count. The season was at least three or four weeks late, having cold nights accompanied with drizzling rains at intervals throughout May until the middle of June. By this time the alfalfa was starting to bloom, "scattering." There were very few stores in the hives, no brood-rearing to speak of, as we have no blossoms to mention until alfalfa comes on. On the 26th of June we had two swarms come out which we had to feed for a few days on account of a cold rain. After then we had fine weather, and the bees went to work with a will on the thousands of acres of alfalfa surrounding us, which had a purple cast by this time. By the middle of July all the alfalfa was cut except a little around ditches, etc., our own fields included, and every thing seemed to be at a standstill in the apiary. Up to this time we had hived 48 swarms, making a total of 128 colonies. There being very little sweet clover in bloom we decided that the only surplus honey we should get would be gathered on our own farm; and having 30 acres or more of alfalfa we knew we could control that amount of pasture, as other

fields are generally cut when coming in bloom, making better hay. When the first cutting of alfalfa was all done we had only 19 colonies working in the supers. On the 5th of August we were putting on another round of supers, honey coming in galore. That 30-acre field was a sight to behold. From morning till night it was a constant uproar. We stood there many times and listened to the buzz overhead as they passed to and fro, it doing us more good to know that they had at last struck a land of plenty, and we the satisfaction of knowing that we can control to a certain extent our own pasture. That alone amounts to us to more than the loss in hay.

Though only a novice of a few years' experience in bee-keeping, my idea of success in that line, "to be master of the situation," is to control as much as possible our own pasture, and not depend on our neighbors being delayed in cutting their fields of bloom. We are not so fortunate as some bee-keepers where nature provides with plenty of moisture and a constant honey-flow throughout the season. A scarcity of water for irrigation means a scant honey crop; therefore, profiting by this year's experience with alfalfa we will try next year to regulate the bloom so as to have a paradise for the bees throughout the season.

I am satisfied that 1000 acres of honey-plant, as stated in GLEANINGS, isn't necessary to take care of 100 colonies of bees. We had 50 colonies that made from three to six supers, while the others fell below three supers.

GEO. J. SMITH.

Fort Lupton, Colorado, Nov. 30.

[These are the kind of facts we are looking for. We should be pleased to hear from others.—ED.]

## THE SUCCESS OF AN A B C SCHOLAR IN CUBA.

A year and a half ago I bought some native bees in the hollow log hives. I knew little about them except how to transfer and how to extract honey, so I got the A B C of Bee Culture and GLEANINGS, and studied them hard. I realized at once I should have to get the bees out of the log hives, so I bought some Dovetailed hives and transferred them. They seemed so gentle that I thought I would try them and not get Italians; but I got very little honey from them that fall, and they let the moth get in the hive and play the mischief. So I bought twelve untested Italian queens from The A. I. Root Co. Nine of them lived, and I had only ten hives to start with last April. By September I got them up to over thirty. Now I have almost one hundred. I lost one or two swarms, and one of my best colonies got smothered in moving it. Then I have been badly handicapped all along by not being able to get supplies, etc., in time. But I shall get some honey this year. I have already extracted 800 lbs. There is that much, and more, in the hives now, and the season is not nearly over yet. Do you think this is doing well?

R. M. MCMURDO.

Cauto, Cuba, Oct. 21.





What hath God wrought?—NUM. 23:23.

Dear friends, I have a wonderful story to tell you—a story that, in some respects, out-rivals the Arabian Nights fables—a story, too, with a moral that I think many of the younger ones need, and perhaps some of the older ones too if they will heed it. God in his great mercy has permitted me to be, at least somewhat, instrumental in ushering in and introducing to the great wide world an invention that may outrank the electric cars, the automobiles, and all other methods of travel, and one which may fairly take a place beside the telephone and wireless telegraphy. Am I claiming a good deal? Well, I will tell my story, and you shall be the judge. In order to make the story a helpful one I may stop and turn aside a good many times to point a moral.

In our issue for Sept. 1 I told you of two young men, two farmer's boys, who love machinery, down in the central part of Ohio. I am now going to tell you something of two other boys, a *minister's* boys, who love machinery, and who are interested in the modern developments of science and art. Their names are Orville and Wilbur Wright, of Dayton, Ohio. I made mention of them and their work on page 241 of our issue for March 1 last. You may remember it. These two, perhaps by accident, or may be as a matter of taste, began studying the flights of birds and insects. From this they turned their attention to what has been done in the way of enabling men to fly. They not only studied nature, but they procured the best books, and I think I may say all the papers, the world contains on this subject. When I first became acquainted with them, and expressed a wish to read up all there was on the subject, they showed me a library that astonished me; and I soon found they were thoroughly versed, not only in regard to our present knowledge, but every thing that had been done in the past. These boys (they are men now), instead of spending their summer vacation with crowds, and with such crowds as are often questionable, as so many do, went away by themselves to a desert place by the seacoast. You and I have in years past found enjoyment and health in sliding down hill on the snow; but these boys went off to that sandy waste on the Atlantic coast to slide down hill too; but instead of sliding on snow and ice they slid *on air*. With a gliding machine made of sticks and cloth they learned to glide and soar from the top of a hill to the bottom; and by making not only hundreds but *more than a thousand* experiments, they became so proficient in guiding these gliding machines that they could sail like a bird, and control its movements up and down as well as sidewise. Now, this was not altogether

for fun or boys' play.\* They had a purpose in view. I want to stop right here to draw one of my morals. If I allude to myself somewhat, please do not think I do it because I wish to boast. Some of you have read or heard me tell of the time when my attention was first called to bees. Almost the first thing I did was to go to the book-stores and see what *books* were to be found on the subject. I studied these books day and night, and read them over and over again. Then I procured the books and bee-journals from the old world; and when the language was something I could not manage I hired an interpreter to translate for me until I knew pretty nearly what the book contained. In less than one year I was in touch with the progressive bee-keepers of the world; and the *American Bee Journal*, that had been dropped for lack of support, was started up again. I mention this to show you that my success in bee culture, from the very first, was not luck or chance. It was the result of untiring energy and work. Now let me draw a contrast. During the years that are past, quite a number of men have come to me with their patented hives. A good many of these men had never seen a bee-journal. Some of them who had paid out their hard earnings to the Patent Office had almost never seen a book on bee culture, and they were not sure, from actual experience, of the existence of the queen-bee. We have inventors at the present time who are giving their lives and money to the four winds in the same poor foolish way. If you wish to make a success of any thing, or in any line among the many lines that lie before us in this great world of ours, find out what the great and good men have done in this special line before you.

Well, these two men spent several summers in that wild place, secure from intrusion, with their gliding machine. When they became experts they brought in, as they had planned to do, a gasoline-engine to furnish power, and made a little success with their apparatus before winter set. As soon as the weather would permit, their experiments were resumed the past season. You may have seen something in regard to it in the papers; but as their purpose has been from the beginning to the end to avoid publicity, the great outside world has had but very little opportunity of knowing what is going on. The conditions were so different after applying power that it seemed at first, to a great extent, as if they would have to learn the trade of guiding their little ship all over again. At first they went only a few hundred feet; and as the opportunity for practice in guiding and controlling it was only a few seconds at a time, their progress

\* When I suggested that, even though sliding down hill on the air was very nice, it must have been quite a task to carry the machine back to the top of the hill every time, the reply was something like this: "Oh! no, Mr. Root—no task at all. Just remember that we always sail *against* the wind; and by a little shifting of the position, the wind does the greater part of the work in carrying it back." It just blows it back (whenever the wind is strong enough) up hill to the starting-point.

was necessarily very slow. Let me digress again just a little.

I do not know exactly how many years ago it was, perhaps something like thirty, that I saw in the *Scientific American* that they had in France what was called at that time a velocipede. As soon as I saw the description I sent an order for one, and I think I had about the first machine in the semblance of a bicycle that was ever in Ohio—perhaps one of the first brought into the United States. The machine cost over \$100; and as it was a heavy affair, the express on it cost quite an item more. When it came to hand, after days and weeks of anxious waiting, neither myself nor anybody else could ride it at all. The whole town jeered at me, and the story of the "fool and his money" was hurled in my teeth so many times I almost dread to hear it even yet. Men of good fair understanding pointed their fingers at me, and said that anybody of good common sense ought to know that *that* thing would not stand up with a man on it, for that would be an utter impossibility. I worked at it, the crowd in my way, for several hours in the morning. Finally I rented the largest hall in the town, went in with one trusty boy who had faith, for a companion, and *locked the door*. After quite a little practice on the smooth floor of the hall I succeeded in riding from one end to the other; but I could not turn the corners. When, after still more practice, I did turn one corner without falling, how my spirits arose! A little later I went in a wabbly way clear around the room. Then my companion did the same thing, and, oh how we did rejoice and gather faith! A little later on, with a flushed but happy face, I went out into the street and rode around the public square. You can guess the rest of it. Well, these boys wanted just the same kind of privacy to try their flying-machine that I needed for my velocipede; but as it measures about forty feet from the tip of one wing to the tip of the other, instead of a large hall they wanted a large level field in some out-of-the-way place. I found them in a pasture lot of 87 acres, a little over half a mile long and nearly as broad. The few people who occasionally got a glimpse of the experiments, evidently considered it only another Darius Green, but I recognized at once they were really *scientific explorers* who were serving the world in much the same way that Columbus did when he discovered America, and just the same way that Edison, Marconi, and a host of others have done all along through the ages.

In running an automobile or a bicycle you have to manage the steering only to the right and left; but an air-ship has to be steered up and down also. When I first saw the apparatus it persisted in going up and down like the waves of the sea. Sometimes it would dig its nose in the dirt, almost in spite of the engineer. After repeated experiments it was finally cured of its foolish tricks, and was made to go like a steady

old horse. This work, mind you, was all new. Nobody living could give them any advice. It was like exploring a new and unknown domain. Shall I tell you how they cured it of bobbing up and down? Simply by loading its nose or front steering-apparatus with cast iron. In my ignorance I thought the engine was not large enough; but when *fifty pounds* of iron was fastened to its "nose" (as I will persist in calling it), it came down to a tolerably straight line and carried the burden with ease. There was a reason for this that I can not explain here. Other experiments had to be made in turning from right to left; and, to make the matter short, it was my privilege, on the 20th day of September, 1904, to see the first successful trip of an airship, without a balloon to sustain it, that the world has ever made, that is, to turn the corners and come back to the starting-point. During all of these experiments they have kept so near the soft marshy ground that a fall would be no serious accident, either to the machine or its occupant. In fact, so carefully have they managed, that, during these years of experimenting, nothing has happened to do any serious damage to the machine nor to give the boys more than what might be called a severe scratch. I think great praise is due them along this very line. They have been prudent and cautious. I told you there was not another machine equal to such a task as I have mentioned, *on the face of the earth*; and, furthermore, just now as I dictate there is probably not another man besides these two who has learned the trick of controlling it. In making this last trip of rounding the circle, the machine was kept near the ground, except in making the turns. If you will watch a large bird when it swings around in a circle you will see its wings are tipped up at an incline. This machine must follow the same rule; and to clear the tip of the inside wing it was found necessary to rise to a height of perhaps 20 or 25 feet. When the engine is shut off, the apparatus glides to the ground very quietly, and alights on something much like a pair of light sled-runners, sliding over the grassy surface perhaps a rod or more. Whenever it is necessary to slow up the speed before alighting, you turn the nose up hill. It will then climb right up on the air until the momentum is exhausted, when, by skillful management, it can be dropped as lightly as a feather.

Since the above was written they have twice succeeded in making four complete circles without alighting, each circle passing the starting-point. These circles are nearly a mile in circumference each; and the last flight made, Dec. 1, could have been prolonged indefinitely had it not been that the rudder was in such position it cramped the hand of the operator so he was obliged to alight. The longest flight took only five minutes and four seconds by the watch. Over one hundred flights have been made during the past summer. Some of them reached perhaps 50 or 60 feet above ground. On both these long trips *seventy pounds* in-



stead of fifty of cast iron was carried on the "nose."

Everybody is ready to say, "Well, what use is it? what good will it do?" These are questions no man can answer as yet. However, I will give you a suggestion or two. The man who made this last trip said there was no difficulty whatever in going above the trees or anywhere he chose; but perhaps wisdom would dictate he should have still more experience a little nearer the ground. The machine easily made thirty or forty miles an hour, and this in going only a little more than half a mile straight ahead. No doubt it would get up a greater speed if allowed to do so—perhaps, with the wind, a mile a minute after the first mile. The manager could doubtless go outside of the field and bring it back safely, to be put in the little house where it is kept nights. But no matter how much time it takes, I am sure all the world will commend the policy so far pursued—go slowly and carefully, and avoid any risk that might cause the loss of a human life. This great progressive world can not afford to take the risk of losing the life of either of these two men.\*

I have suggested before, friends, that the time may be near at hand when we shall not need to fuss with good roads nor railway tracks, bridges, etc., at such an enormous expense. With these machines we can bid adieu to all these things. God's free air, that extends all over the earth, and perhaps miles above us, is our training field. Rubber tires, and the price of rubber, are no longer "in it." The thousand and one parts of the automobile that go to make its construction, and to give it strength, can all be dispensed with. You can set your basket of eggs almost anywhere on the upper or lower deck, they will not even rattle unless it be when they come to alight. There are hundreds of queer things coming to light in regard to this new method of travel; and I confess it is not clear to me, even yet, how that little aluminum engine, with four paddles, does the work. I asked the question, "Boys, would that engine and these two propellers raise the machine from the ground if placed horizontally above it?"

"Certainly not, Mr. Root. They would not lift a quarter of its weight."

"Then how is it possible that it *sustains* in the air as it is?"

The answer involves a strange point in the wonderful discovery of air navigation. When some large bird or butterfly is soaring with motionless wings, a very little power from behind will keep it moving. Well, if this motion is kept up, a very little incline of the wings will keep it from falling. A little *more* incline, and a little more push from behind, and the bird or the butterfly, or the machine created by human hands, will gradually rise in the air. I was surprised at the speed, and I was astonished at the

wonderful lifting power of this comparatively small apparatus. When I saw it pick up the fifty pounds of iron so readily I asked if I might ride in place of the iron. I received, by way of assurance, the answer that the machine would no doubt carry me easily. You see then I would have the "front seat;" and even if it is customary (or used to be in *olden* times) to accord the front seat to the ladies, I think the greater part of them would say, "Oh! sit still, Mr. Root. Do not think of getting up to give us your seat."

At first there was considerable trouble about getting the machine up in the air and the engine well up to speed. They did this by running along a single-rail track perhaps 200 feet long. It was also, in the early experiments, found advisable to run against the wind, because they could then have a greater time to practice in the air and not get so far away from the building where it was stored. Since they can come around to the starting-point, however, they can start with the wind even behind them; and with a strong wind *behind* it is an easy matter to make even *more* than a mile a minute. The operator takes his place lying flat on his face. This position offers less resistance to the wind. The engine is started and got up to speed. The machine is held until ready to start by a sort of trap to be sprung when all is ready; then with a tremendous flapping and snapping of the four-cylinder engine, the huge machine springs aloft. When it first turned that circle, and came near the starting-point, I was right in front it; and I said then, and I believe still, it was one of the grandest sights, if not the grandest sight, of my life. Imagine a locomotive that has left its track, and is climbing up in the air right toward you—a locomotive without any wheels, we will say, but with white wings instead, we will *further* say—a locomotive made of aluminum. Well, now, imagine this white locomotive, with wings that spread 20 feet each way, coming right toward you with a tremendous flap of its propellers, and you will have something like what I saw. The younger brother bade me move to one side for fear it might come down suddenly; but I tell you, friends, the sensation that one feels in such a crisis is something hard to describe. The attendant at one time, when the rope came off that started it, said he was shaking from head to foot as if he had a fit of ague. His shaking was uncalled for, however, for the intrepid manager succeeded in righting up his craft, and she made one of her very best flights. I may add, however, that the apparatus is secured by patents, both in this and in foreign countries; and as nobody else has as yet succeeded in doing any thing like what they have done I hope no millionaire or syndicate will try to rob them of the invention or laurels they have so fairly and honestly earned.

When Columbus discovered America he did not know what the outcome would be, and no one at that time knew; and I doubt

\*If these two men should be taken away by accident or otherwise, there is probably no one living who could manage the machine. With these men to teach them "the trade" however, there are plenty who could doubtless learn it in a few weeks.